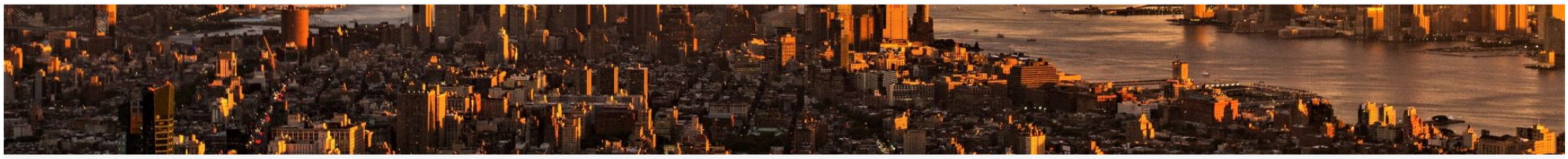

What is the level of computers designed and produced in Hong Kong 36 years ago? Laser310 and VTech

2025-01-14 09:27

Preface

Laser310 is a cheap home computer around the 1980s, mainly capable of executing Microsoft BASIC 2.0, which is a programming language written by Bill Gates and distributed to many manufacturers.

0. Youth's Enlightenment

Starting from the baby, the computer enlightenment began after this sentence resounded across the country.

Background and product description

In the 1980s, the three major domestic microcomputers, in addition to the most famous and expensive Apple II, there were also the Chinese learning machine developed in China, and the more niche Yangtze River, Zijin microcomputers, etc.

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Of course, there is actually a cheaper model in some schools: Laser310

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LASER has historically produced models such as LASER50, LASER200, LASER300, LASER305, LASER310, LASER500, LASER700, etc.

The difference between the models is mainly in memory and expansion capabilities. LASER310 is one of the most widely sold models because it sells more.

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Standard specs : Z80A, 3.58MHZ, 2K Video RAM, 6847 video chip. 16K ROM.
Laser 100 and 110 : Microsoft TRS-80 Level I BASIC. All the rest contain Microsoft TRS-80 Level II BASIC, with hidden tokens for ~45 commands.

Computer	RAM
Laser 100	2K
Laser 110	4K
Laser 200	2K
Laser 210	6K
Texet-TX8000A	4K
VZ200	6K
Smart-Alec Jr 100	6K
Laser 305	2K. (1)
Seltron	2K. (2)
VZ300	16K
VZ300	64K. (3)

头条 @新昼测评团

The last model with the highest configuration in the Zilog era is LASER700, with up to 128KB of memory, 32KB of ROM and 3.7Mhz Zilog Z80A processor. The entire series is using Zilog's 8bit processor.

头条 @新昼测评团

In addition to the three-digit model, there is also a four-digit model. At this time, it is not a cheap positioning. The 6502 processor is used, the same as Apple.

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As an Apple compatible machine, the Laser3000 has up to 64K of RAM, and can even be expanded to 192K. The price is no longer so simple. Its full version costs $499. So this machine doesn't sell much.

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In addition to the LASER series, a new series called IQ128 and a product line for home entertainment have been opened with the same architecture. This is more like a learning machine when you were a child.

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This product is positioned as a home computer. It was produced and supplied to the mainland in 1984, used for teaching in schools, and also used in training institutions and children's palaces.

LASER310 main configuration

CPU: Zilog Z80A Z8400APS

Graphics chip: Motorola 68070

Random read and write memory: 16KB to 64KB

Video memory: 2KB HN613128P

Non-volatile memory: 16KB

Other: some custom IO chips

The external memory supports tape and floppy disk, and the output supports RF signal

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As a learning machine, the cost of Laser310 is not high. It is located in the middle level, around 240 francs, and is a very cheap model compared to the Apple II, which costs thousands of dollars.

This time @ Bai Guangda sent me a Laser310. This is the first time I have used this learning machine. Let's get up and see how it is.

There are two purposes, one is to understand the Laser310, and I want to try and develop a system I envisioned before.

1. Laser310 startup and disassembly

Laser310 has 46 buttons, and all the accessories of a computer are integrated in this body.

As a computer in the 1980s, you can see the typical features of many inexpensive models of the year, small appearance, compact keyboard layout, and instructions on the keycaps, and you can use Ctrl+keys to quickly input.

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There are four main output and input of Laser310, and there are three on the side, namely 9V, tape interface and monitor interface

On the other side of the fuselage, there is a TV high-frequency interface for connectin

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There is a unique serial number on the back, as well as a heat dissipation opening.

Following the instructions marked on the shell, I tried to connect a 9V power supply to t

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The monitor used a German Korin monochrome monitor, which was also produced in 1984.

Turn on the switch and it lights up successfully. Of course, if it is a Japanese model, b positive or externally negative or internally negative and externally positive.

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VideoTechnology Basic V2.0 Ready is displayed on the monitor screen

I tried a simple BASIC statement and it can be executed normally.

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Comparing with the Chinese learning machine, it can be found that the size of Laser310 is much smaller, and of course the number of buttons and scalability are also worse.

There are also differences in thickness, and the production time of the two machines is

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The Laser310 uses a cross-axis core, which makes me think that maybe I can use modern keycaps or install the Laser310 keycaps on today's keyboards.

To disassemble them is very simple, a chip pulling tool can be completed.

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These axle cores look a little special, mainly because it seems that they are not sure whether they are mechanical trigger structures.

These keycaps were picked up after I cleaned them with ultrasonic

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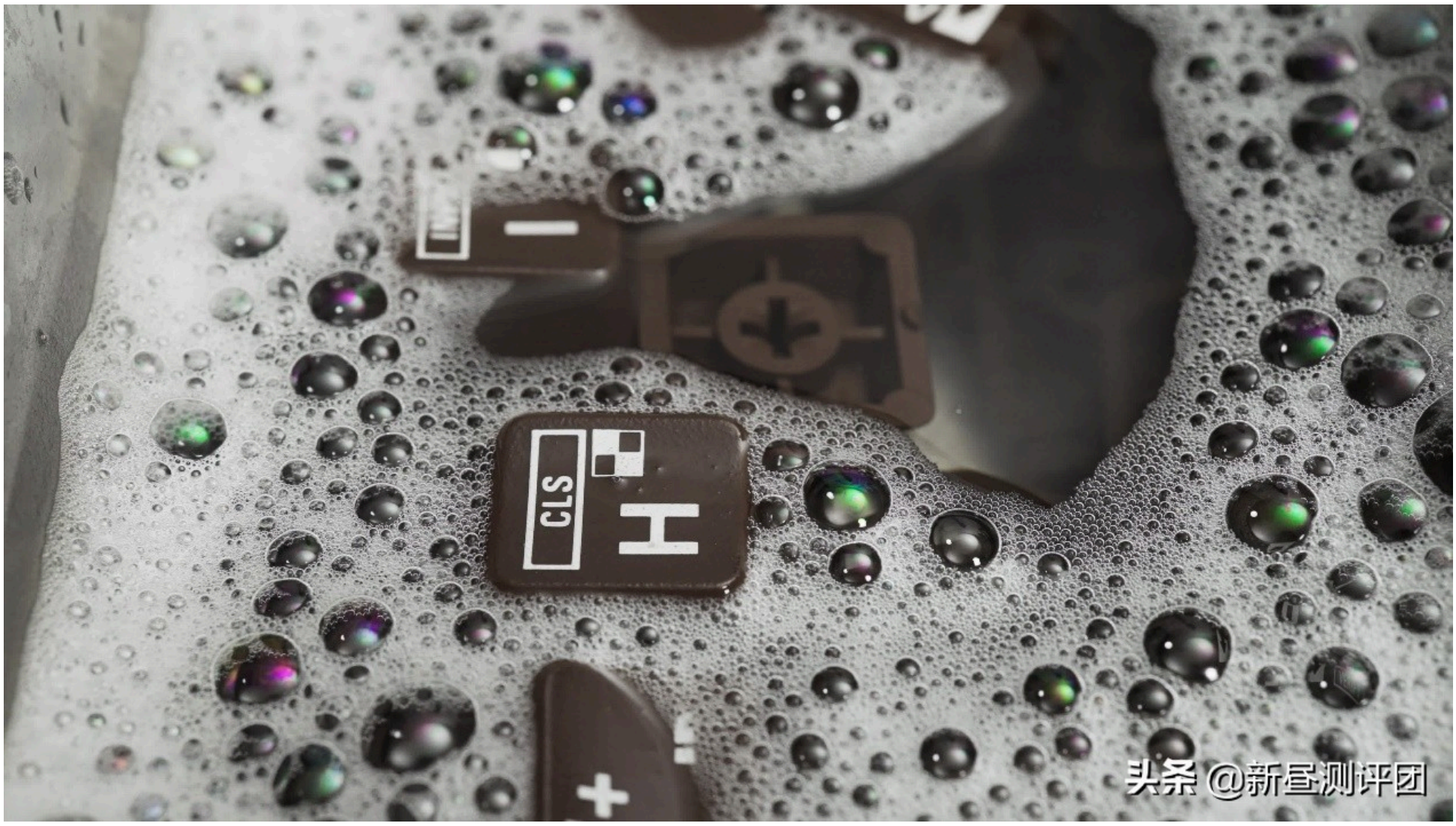
Because they did not show serious stains, they were only treated with a secondary cleaner.



After unplugging all the keycaps, I disassembled the machine into two parts. The difference from earlier microcomputers is that it has a shielded shell design.

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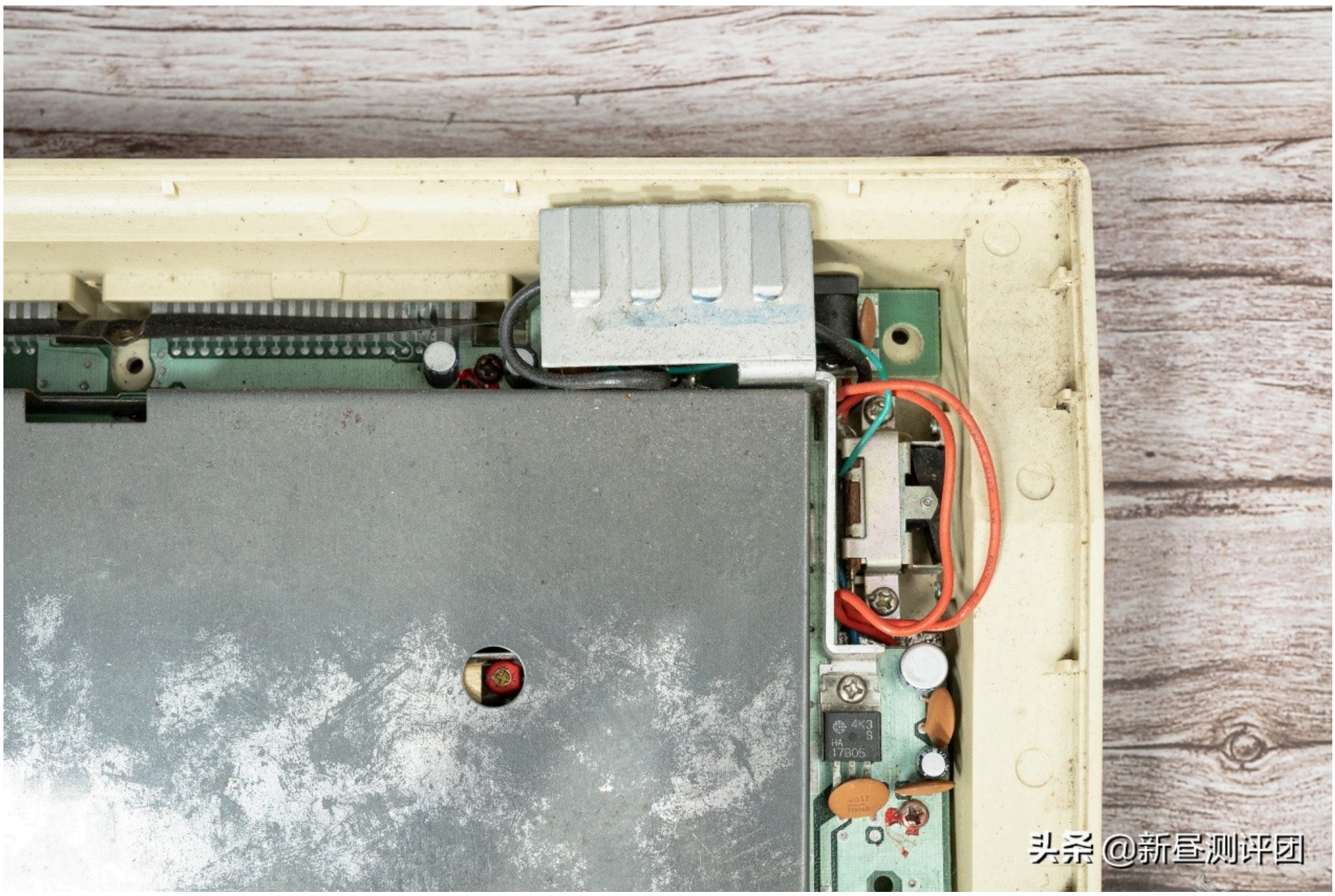
There is a heat sink in the upper right corner, which extends long to the side of the 7805 step-down chip.



I used a vacuum cleaner to clean the dust inside. Because there are not many heat di

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Next, I disassembled this keyboard. After opening the keyboard, it is a membrane keyboard that is relatively rare among players. However, I thought that the membrane keyboard should be a product after 1995. This refreshed my understanding.

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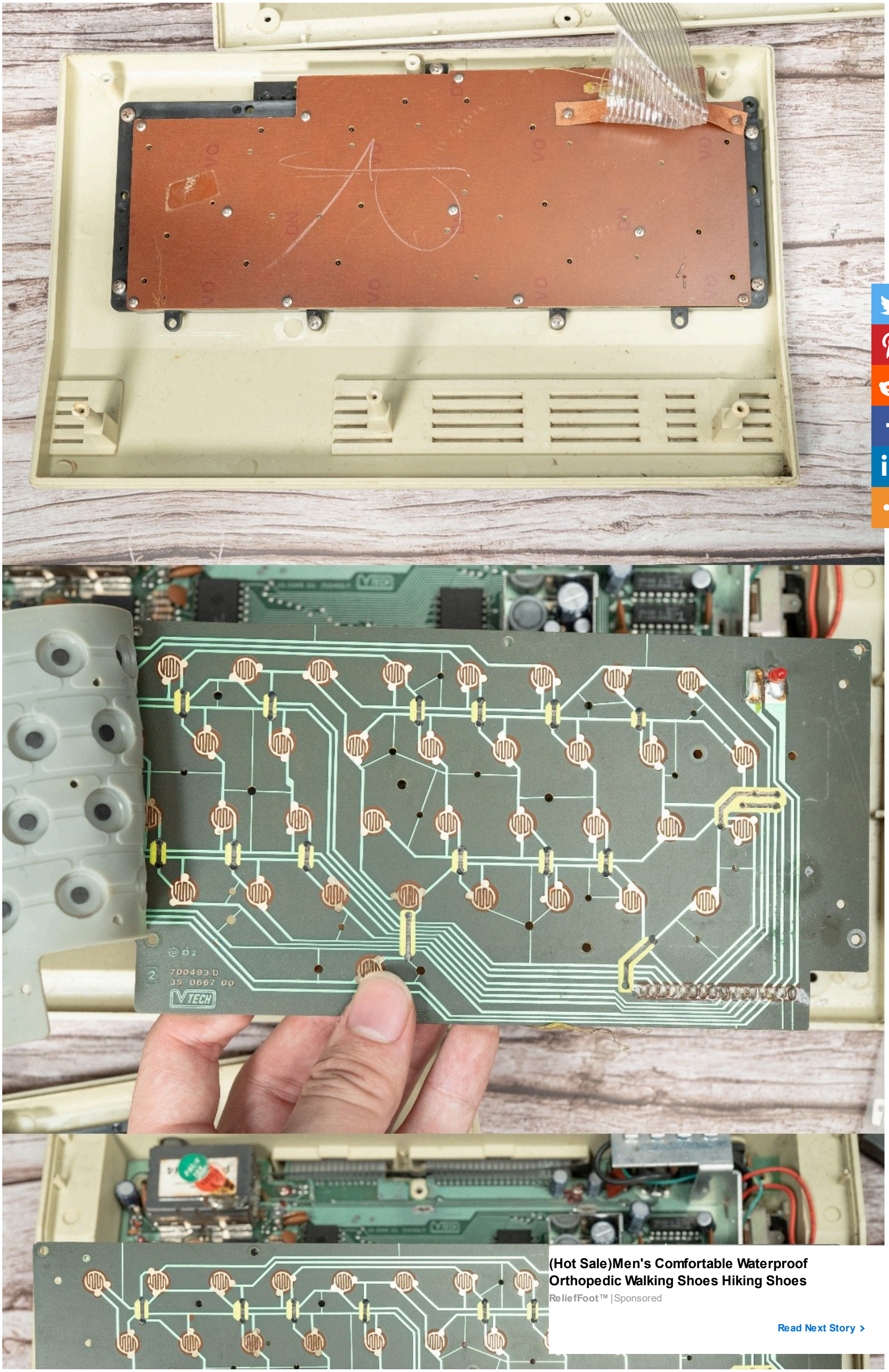

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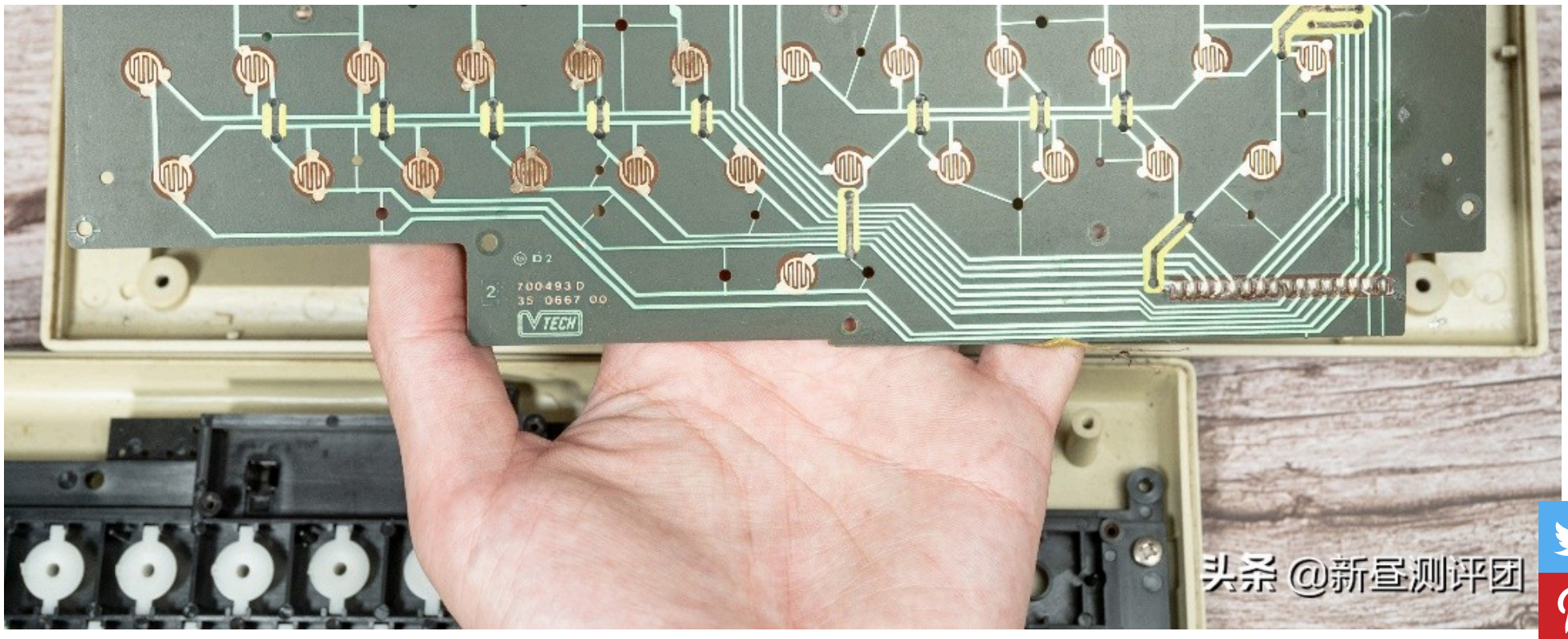
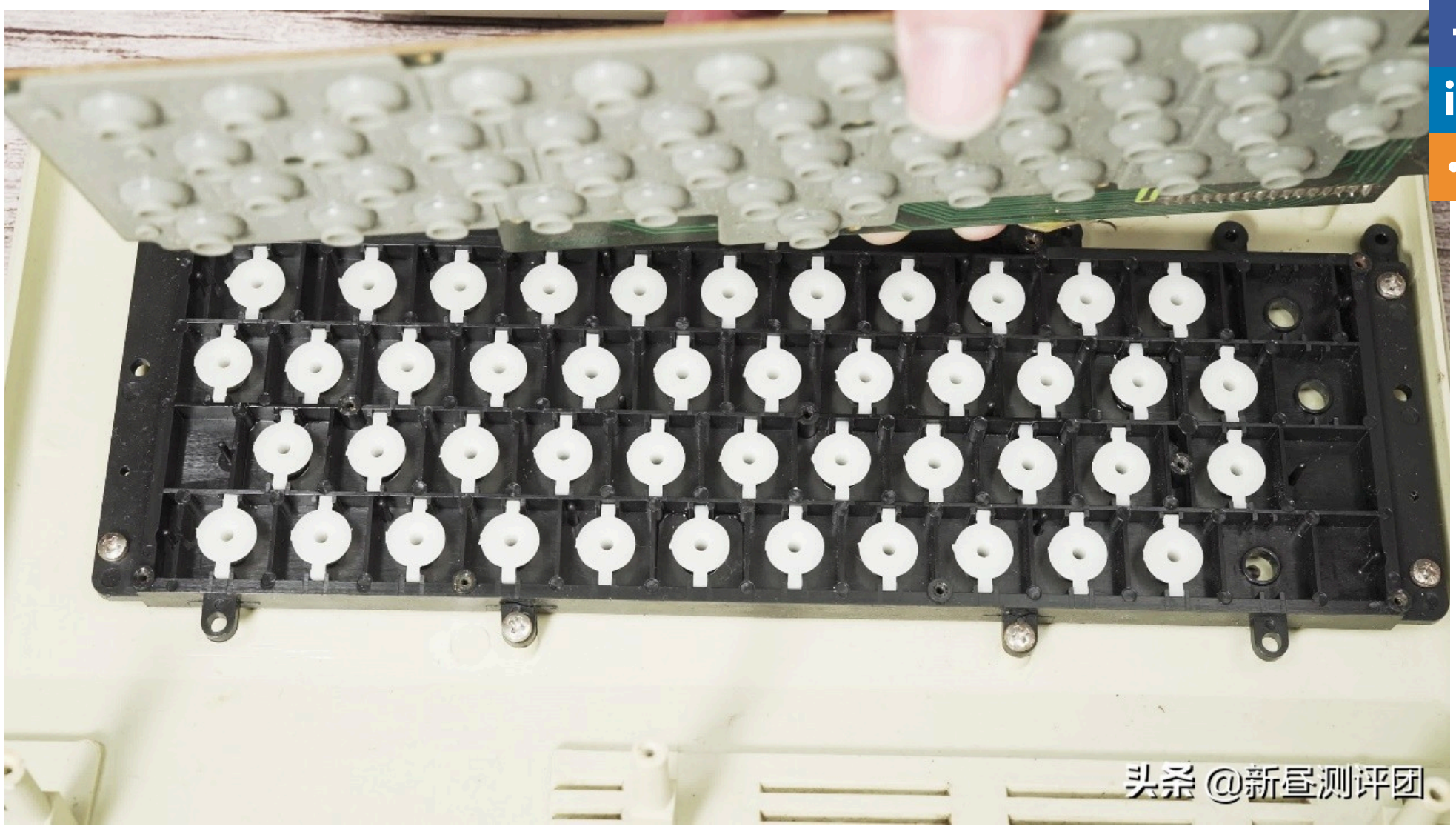


And below the film you can see all the shaft cores.



There is some sticky dust on the film. The handling is very simple. Just flush it directly.

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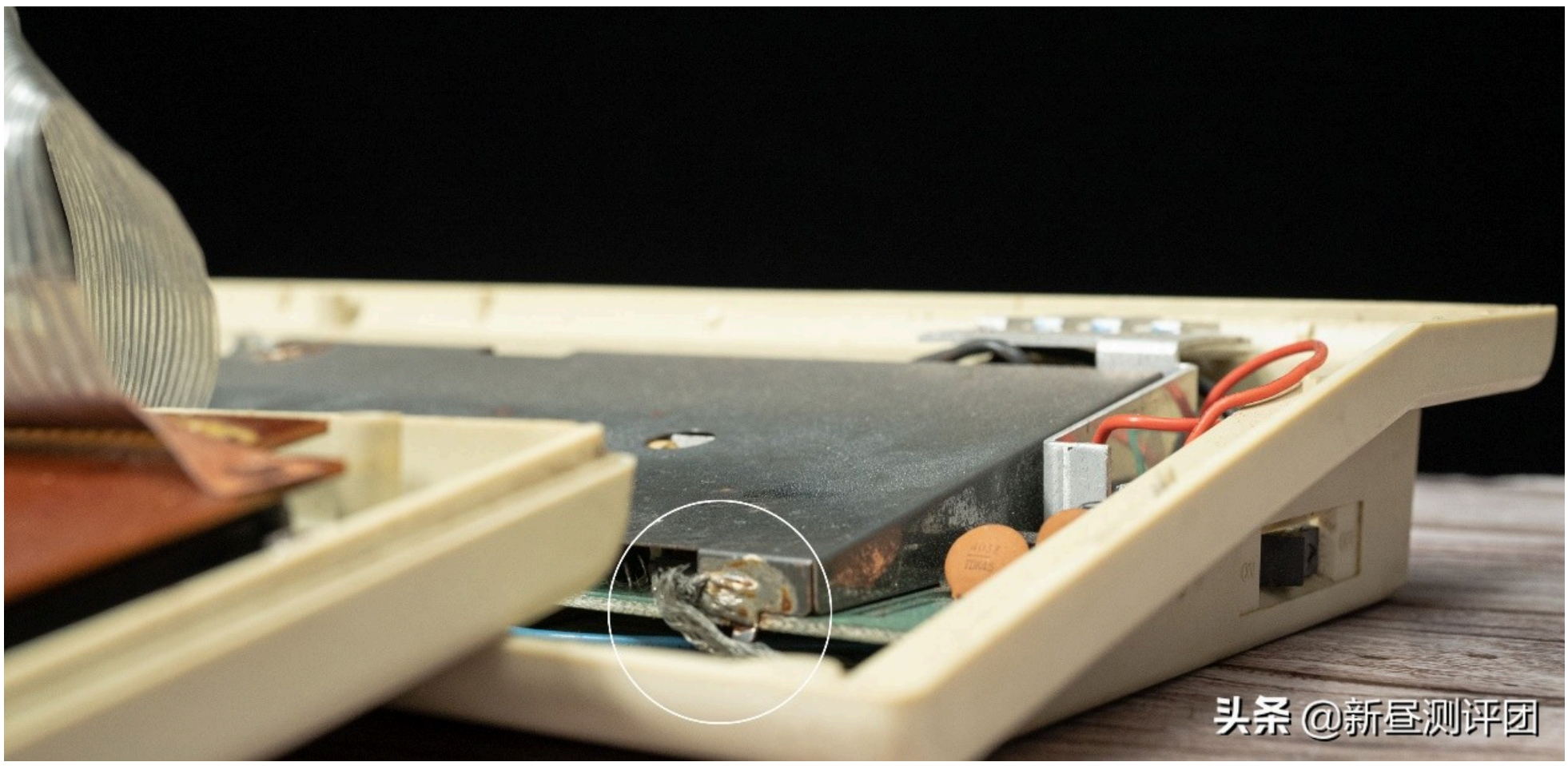
The shielding shell seems to have been removed for a second time, so I simply unloaded it. The bottom metal layer and the upper aluminum shell were actually connected by multiple strands of aluminum wire (circled position).



Let's take a look at the motherboard. I think the entire wiring is relatively regular, with clear partitions and mature design.

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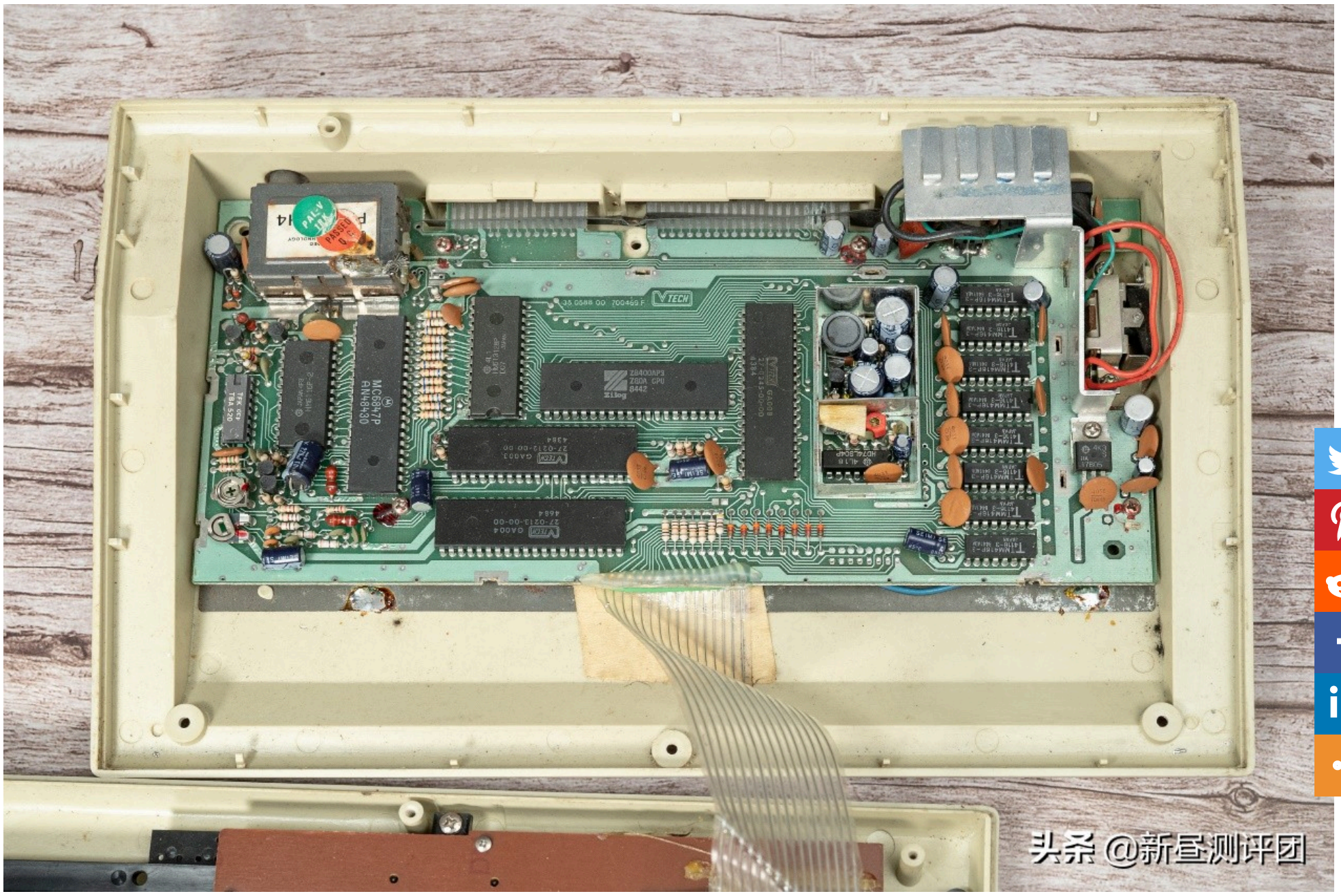
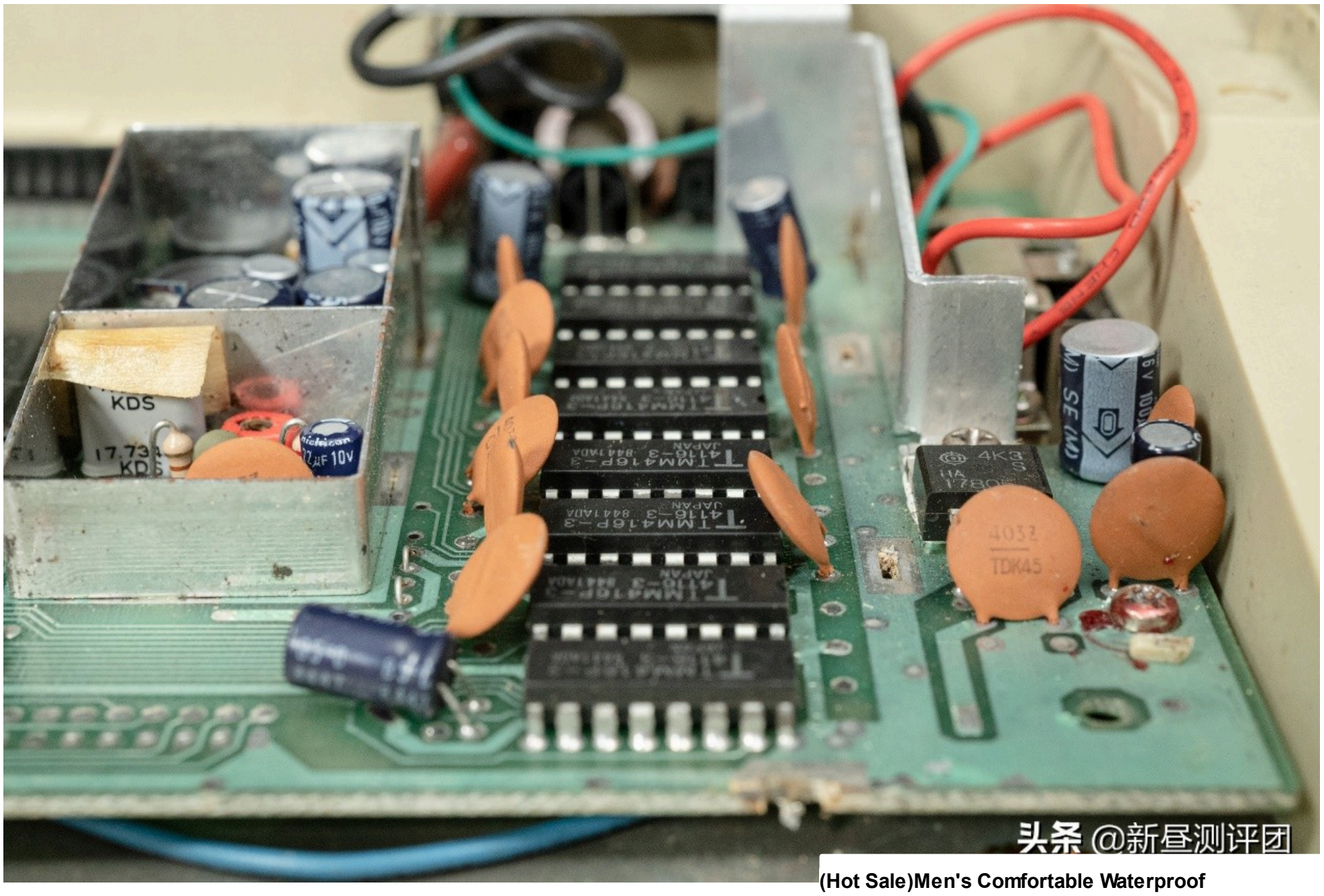


On the far right is RAM. This machine has a total of 8 4116 DRAM chips to form the RAM required for operation (external expansion is possible)



RAM model TMM416P-3, from Toshiba, Japan.

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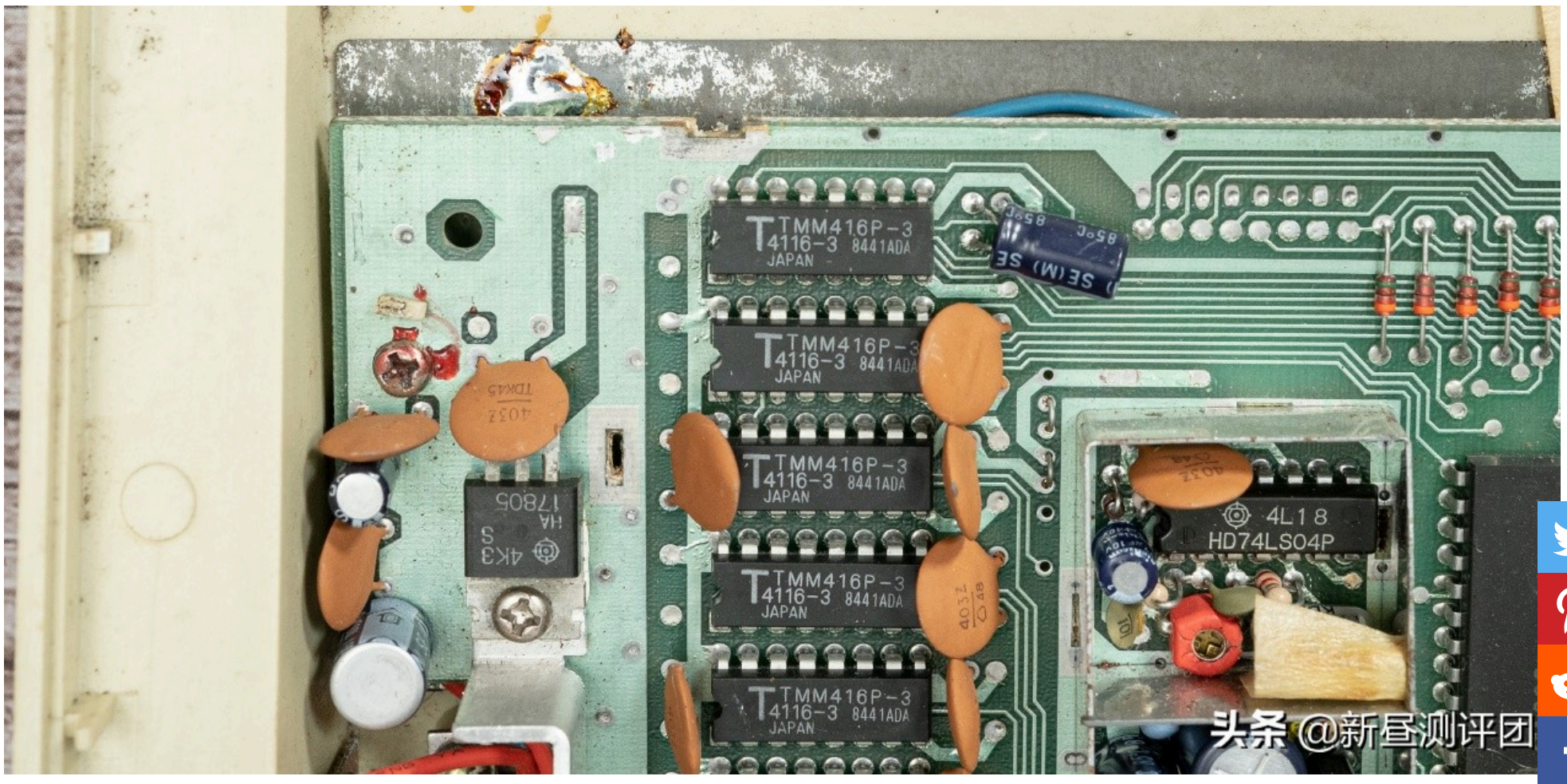

I marked the chip. The custom chip is mainly responsible for IO processing, such as keyboard recognition, for example, loading ROM into memory, and controlling CPU operations. The computer program is mainly stored in HN613128, which is a 48K ROM, the same model as ZX SPECTRUM (another home computer).

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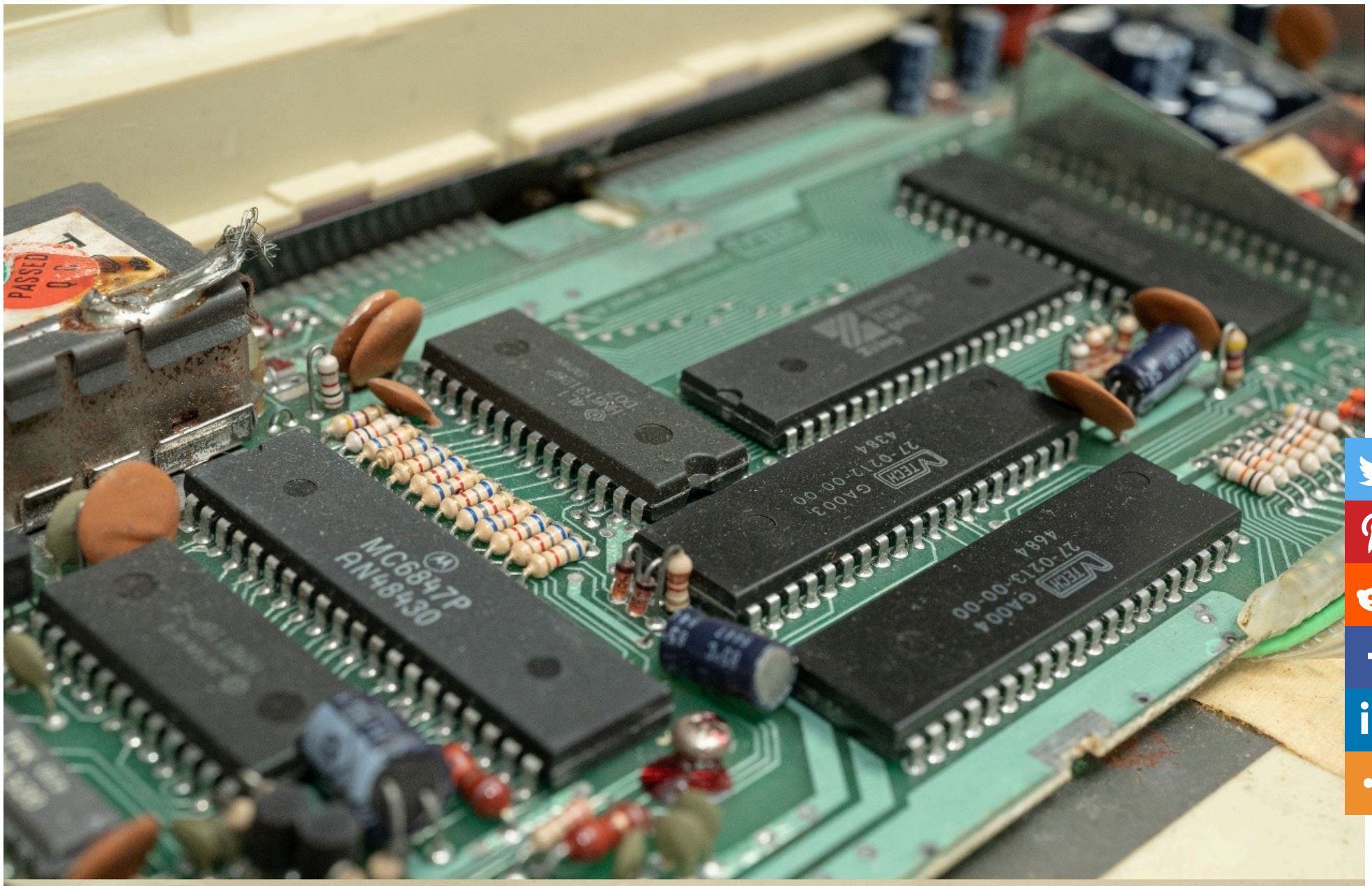

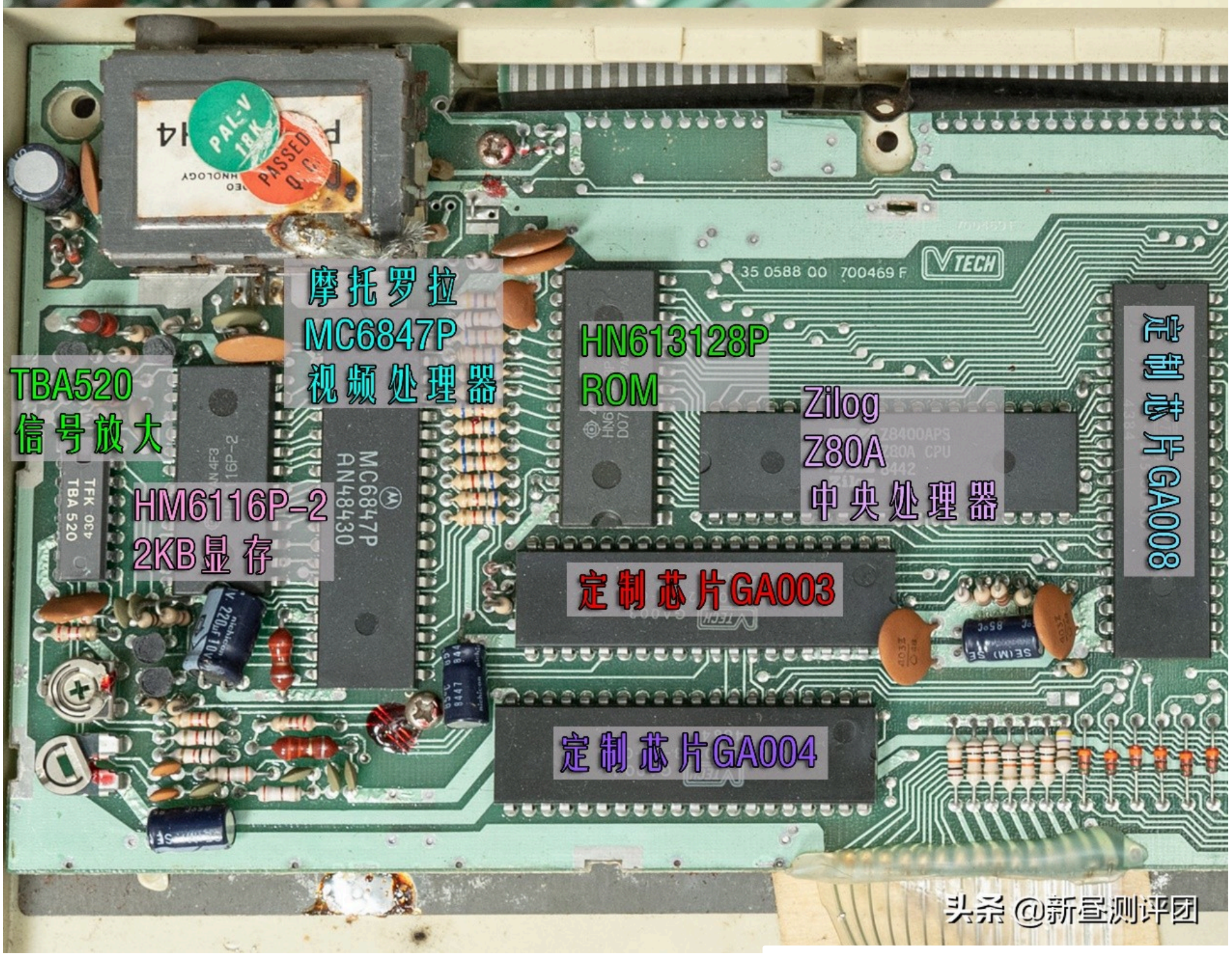

In terms of hardware, there are some differences between Laser310 and Laser200, wh

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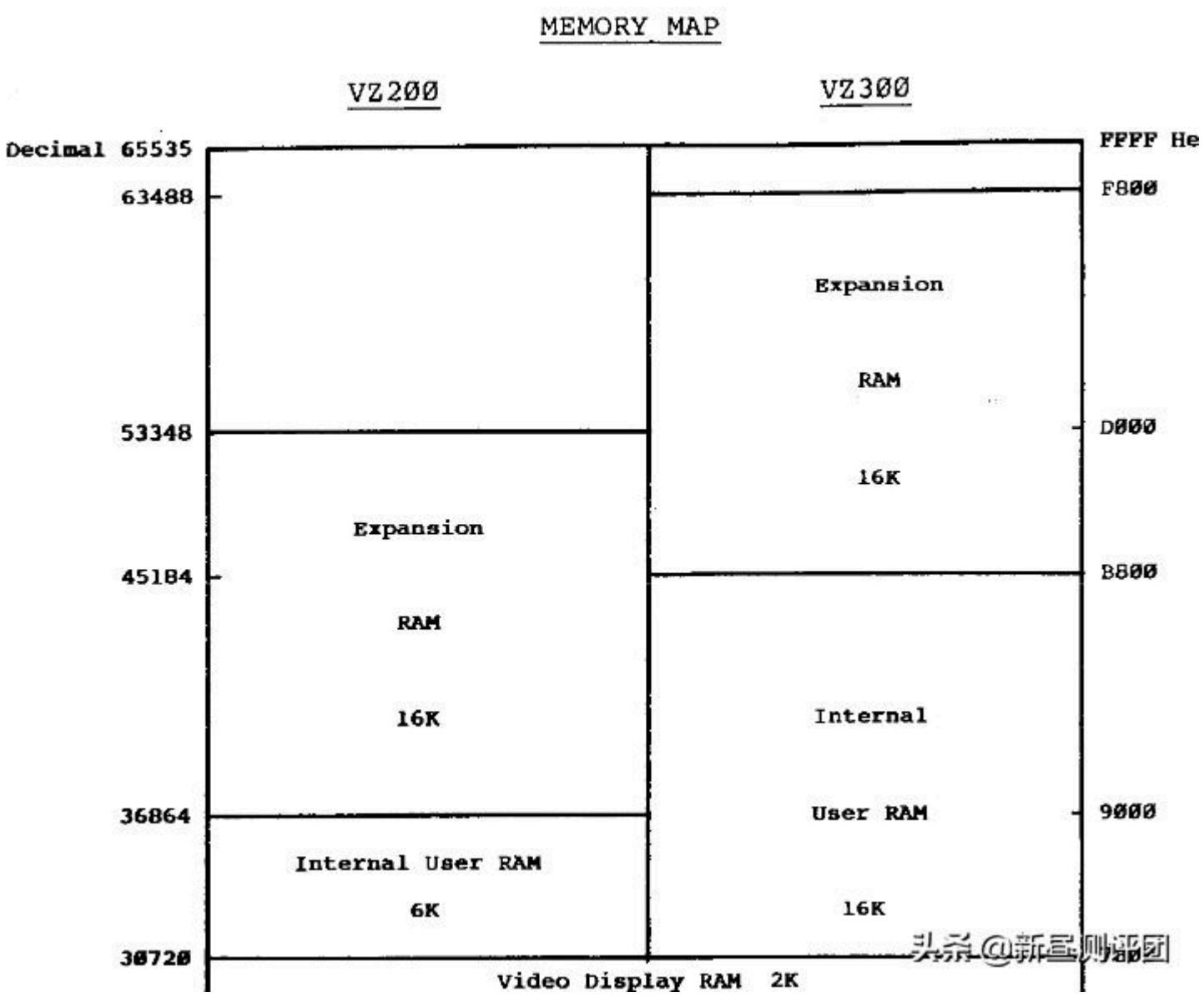
Although the operation is similar, in fact, it can be seen from the memory distribution below that the user available memory (User RAM) of the Laser310 will be 10KB more.



After unscrewing the screw that secures the motherboard, I was able to take out the wi

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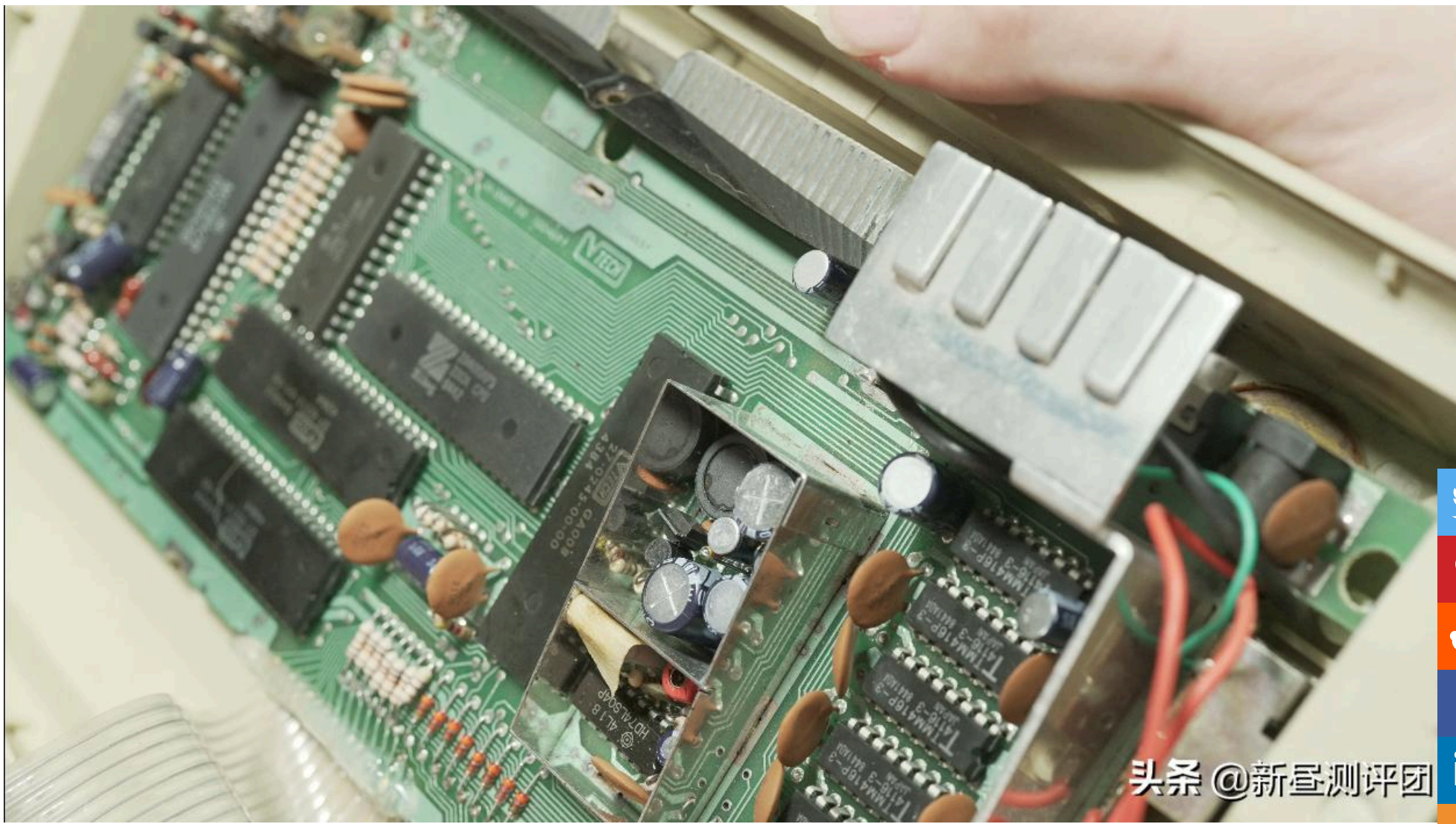
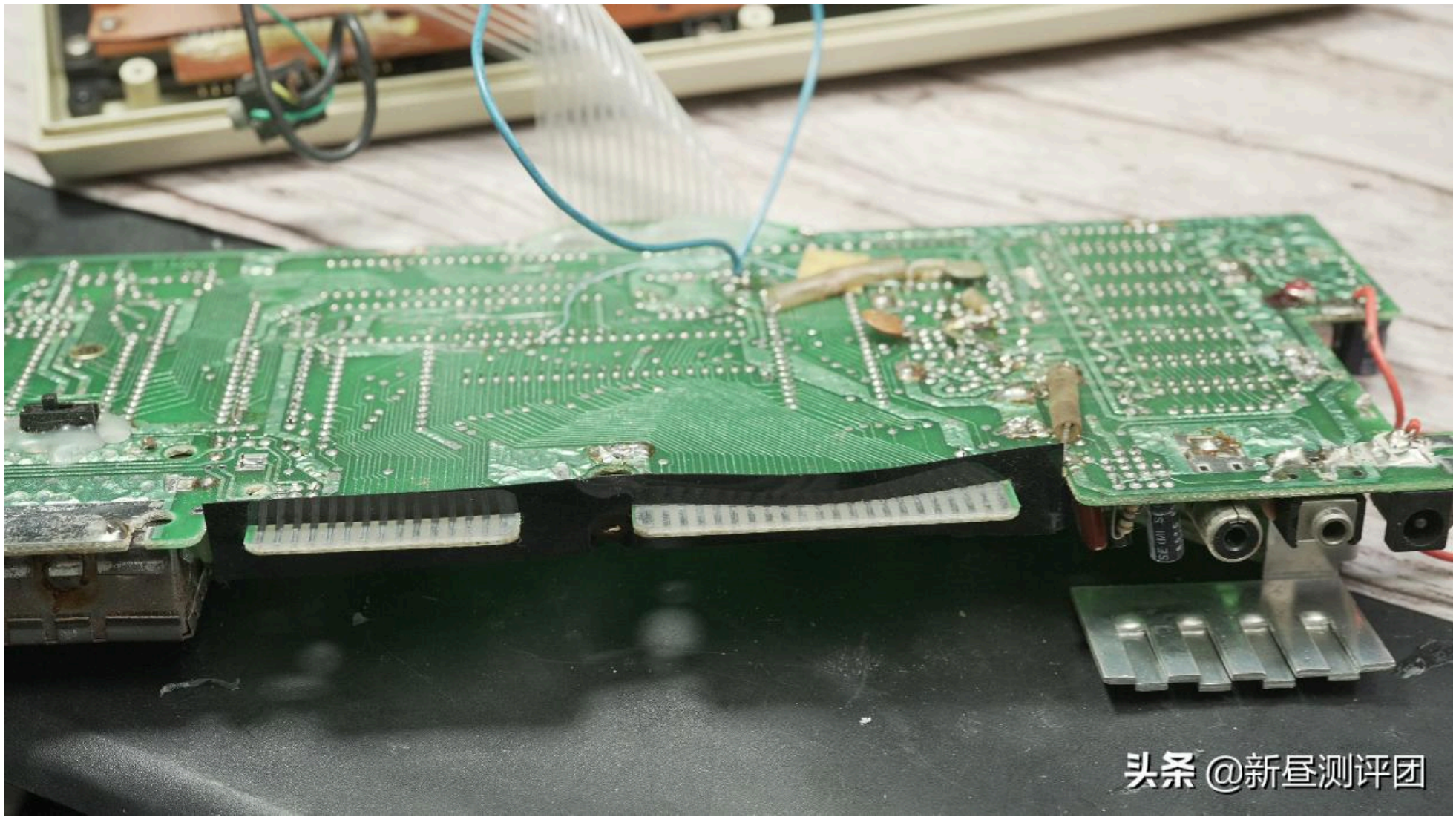


On the golden finger part of the external interface, there is also a black PVC sheet to prevent dust.



Although there are some rust stains, the integrity of the computer shell is no problem. The floating rust is removed after sanding.

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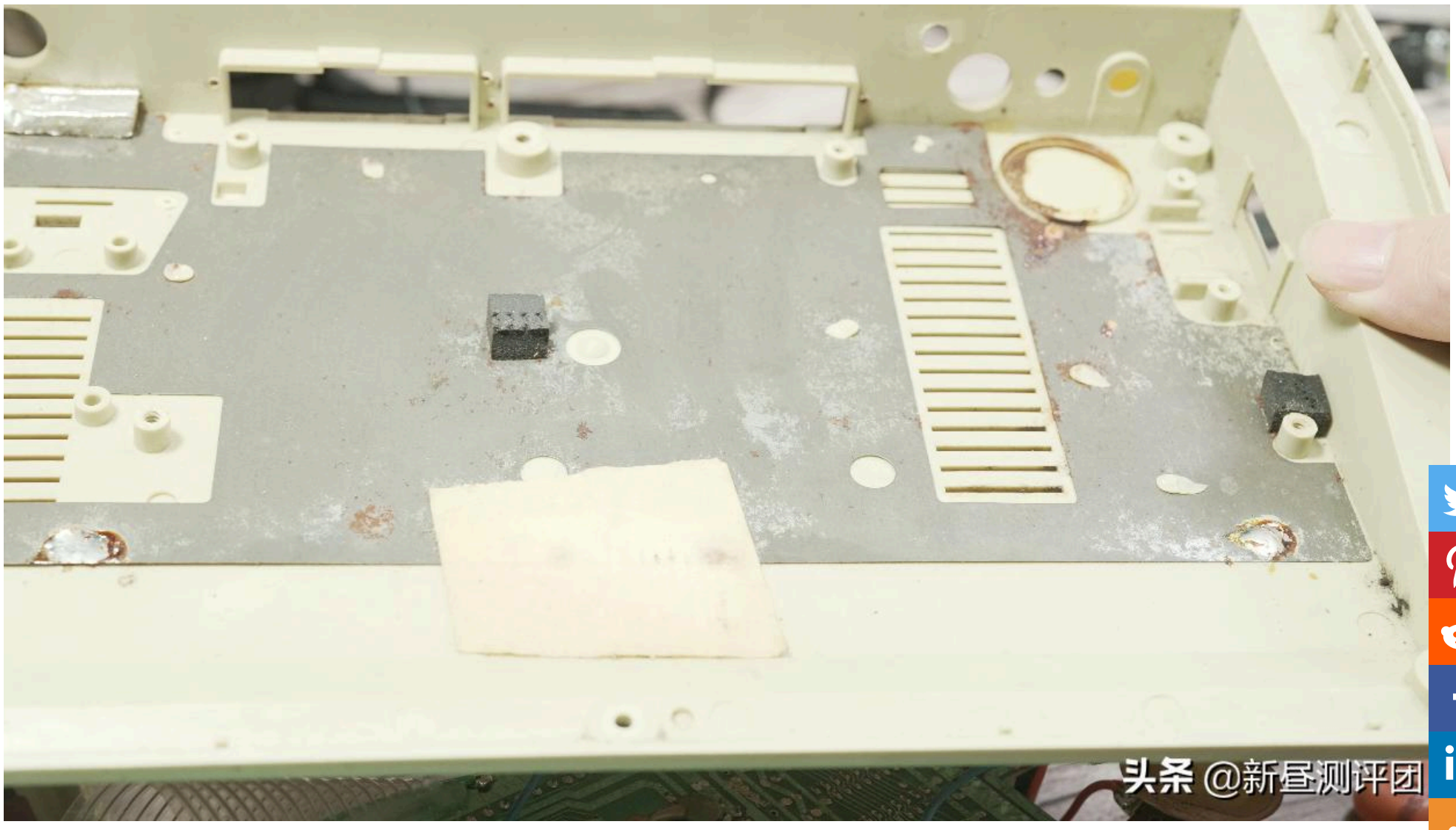
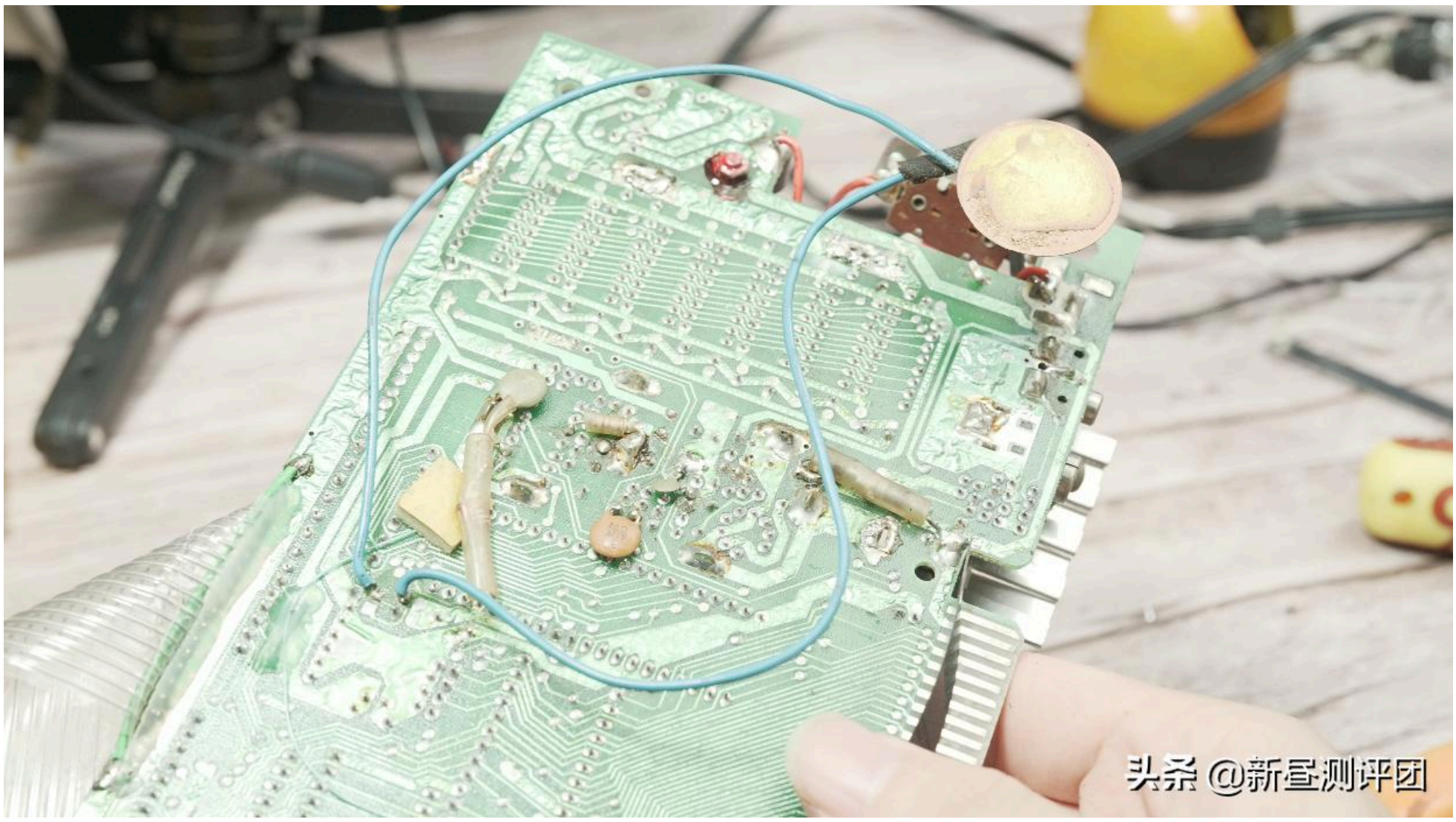


You can see that there are many additional components at the bottom, and some resistors are also protected by bushings



At first I thought that someone had repaired this machine. Later I discovered that this was actually an official work. This is a hardware patch that VTech applied to the Laser310 to fix design vulnerabilities. It was the first time I saw it with so many additions.

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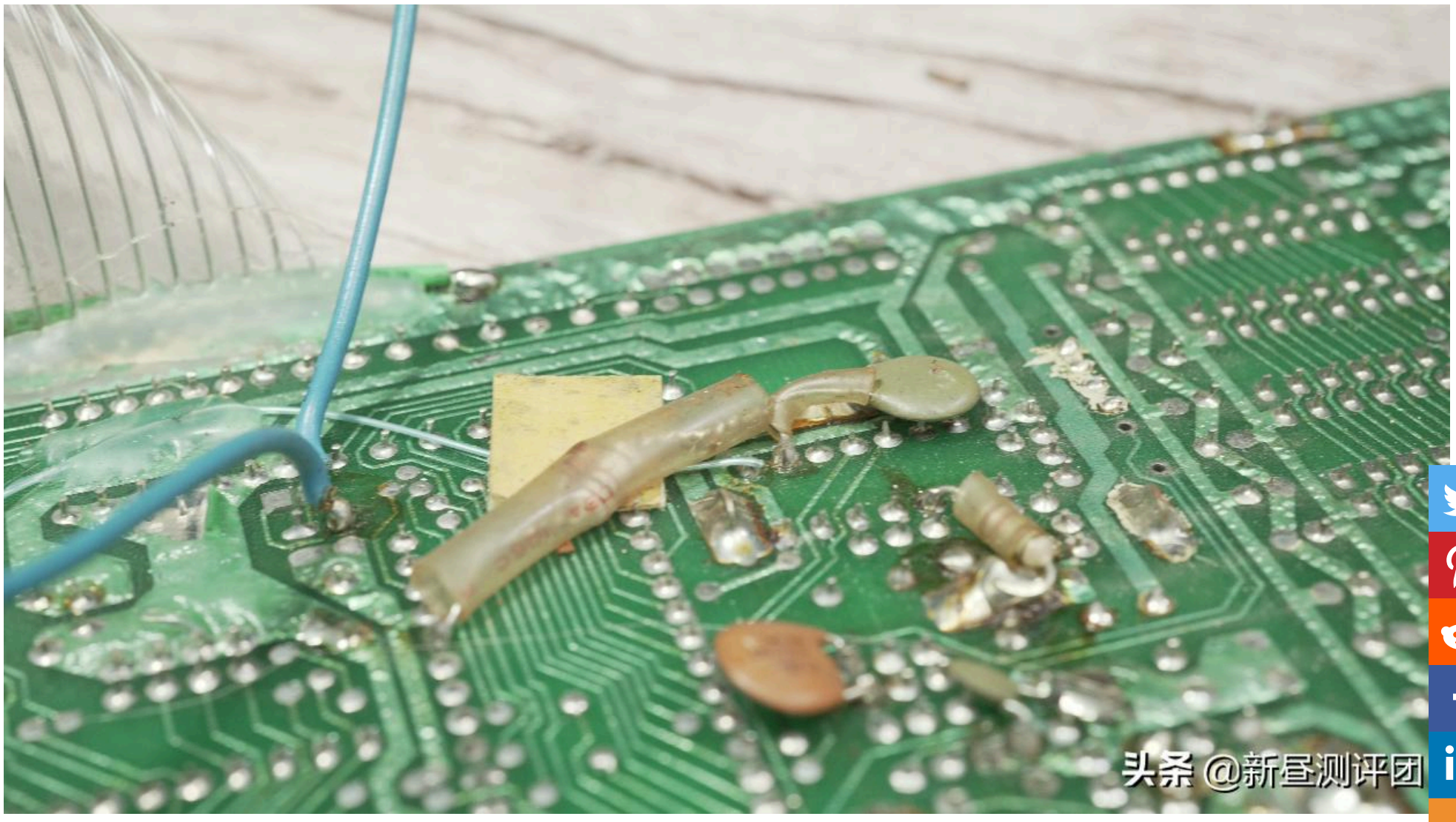
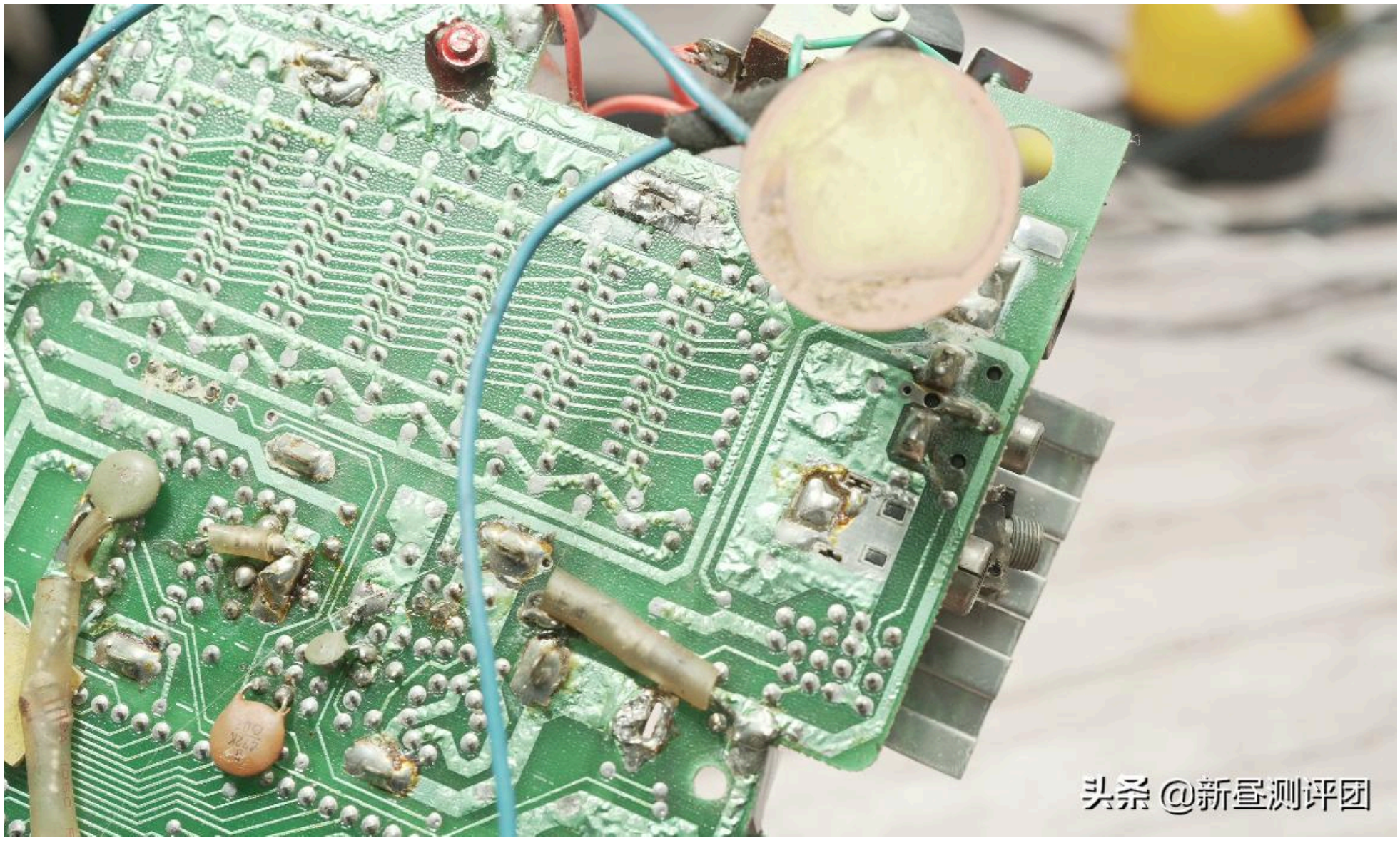


The blue cable is connected to the buzzer, and you can see that the green oil covering the surface of the solder layer is peeling off, and it can be pulled down gently.



Of course, this machine is indeed modified, adding such a 3.5 headphone jack, which is connected in parallel with the buzzer.

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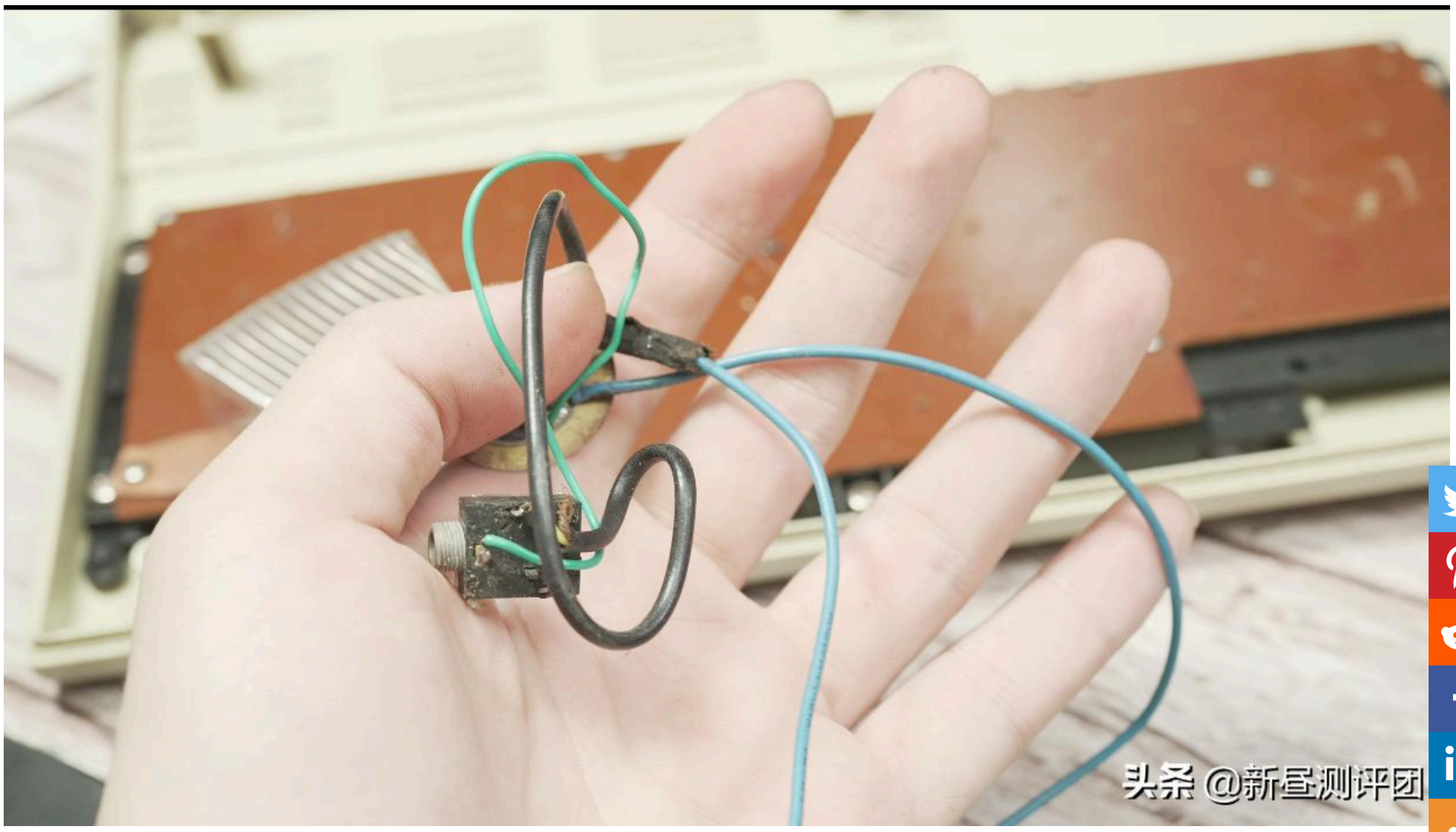
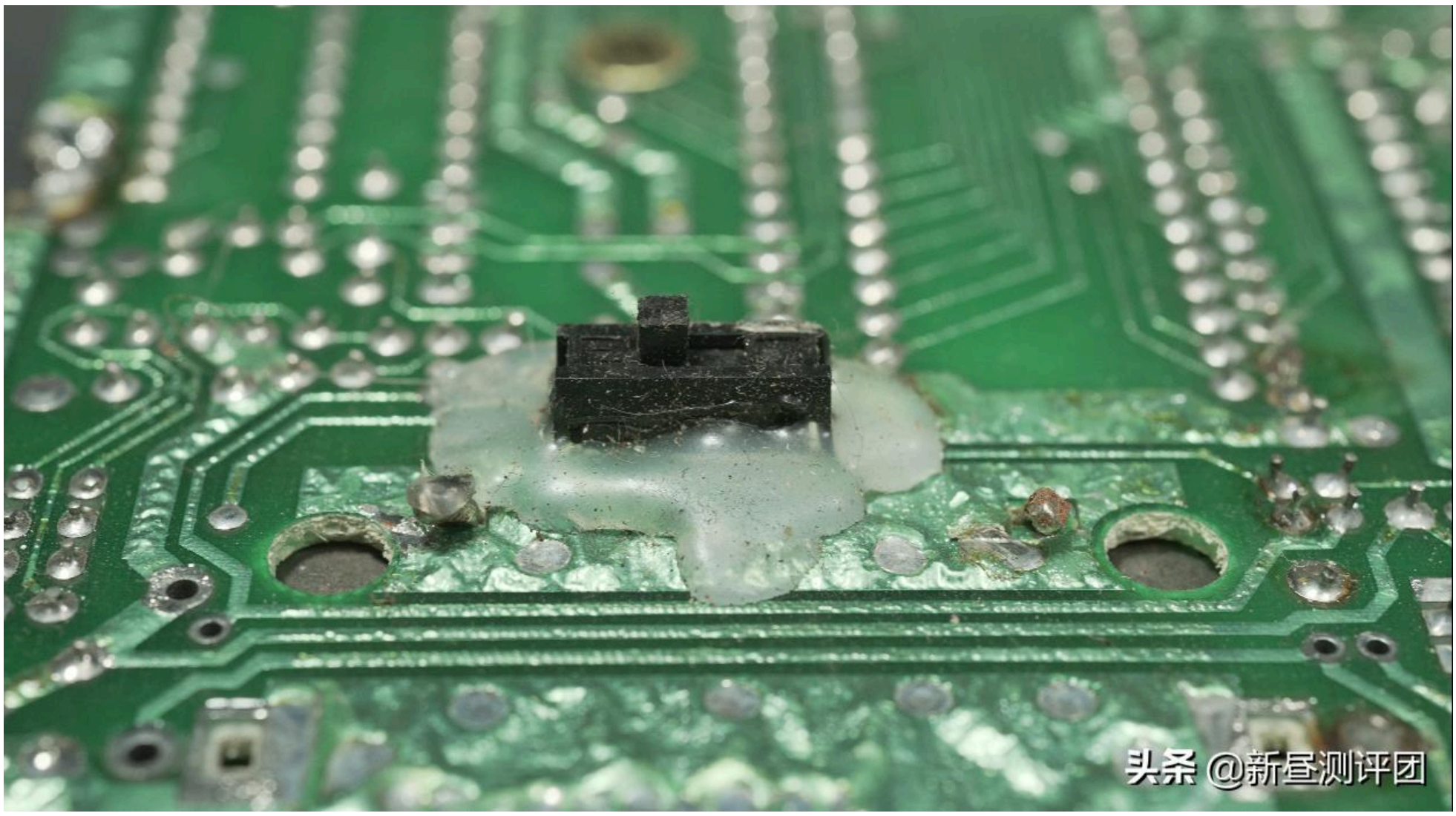


There is such a switch on the back, which is specially glued. The purpose of this switch is to switch the display mode. The Laser310 supports two display modes of high resolution 4 colors or low resolution 8 colors. I heard that this function is also available in Apple II.



After reassembly, plug in the power supply and plug into the monitor, so that the computer can be used. To protect my eyes, I still use the LCD screen behind me.

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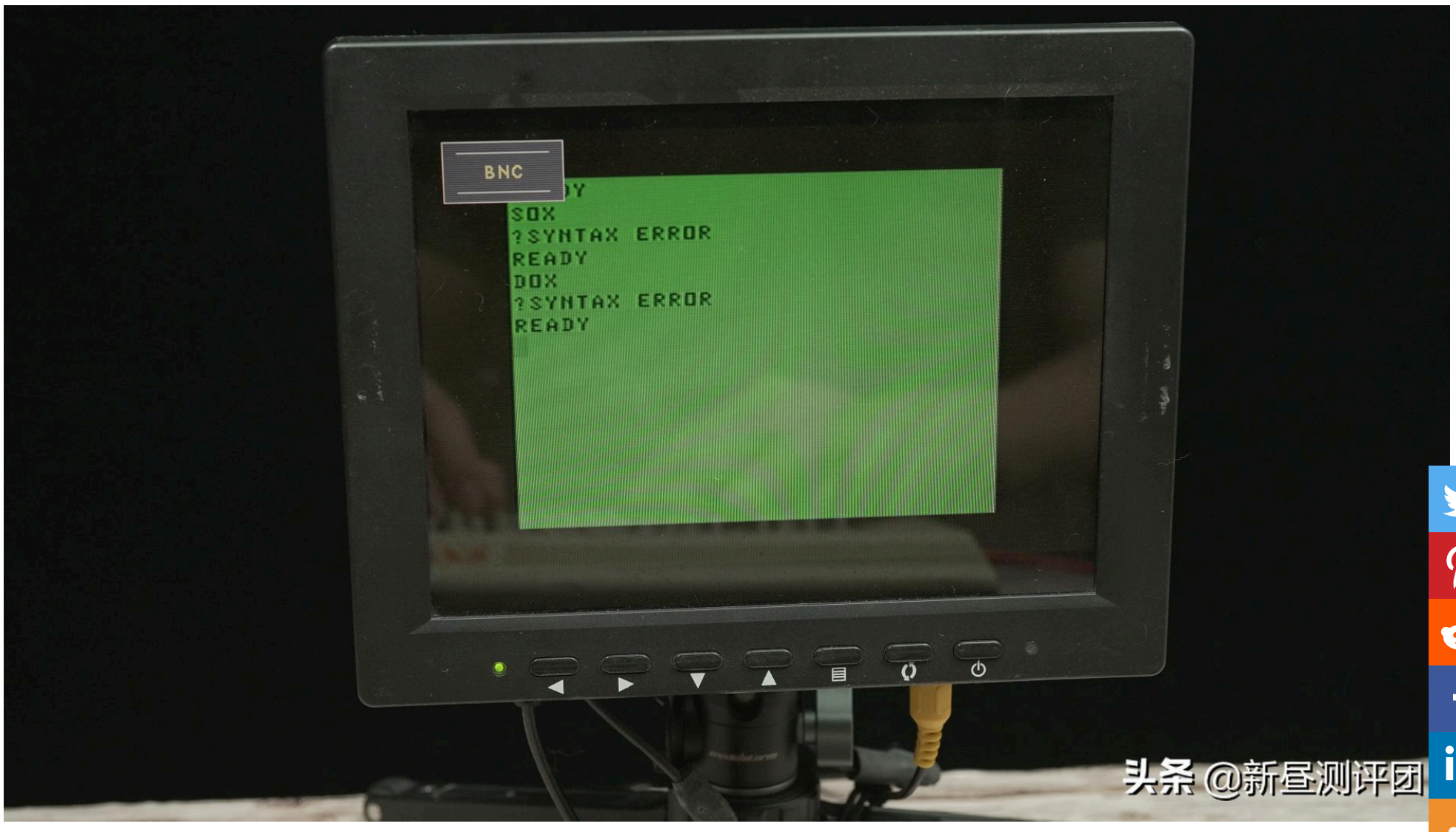
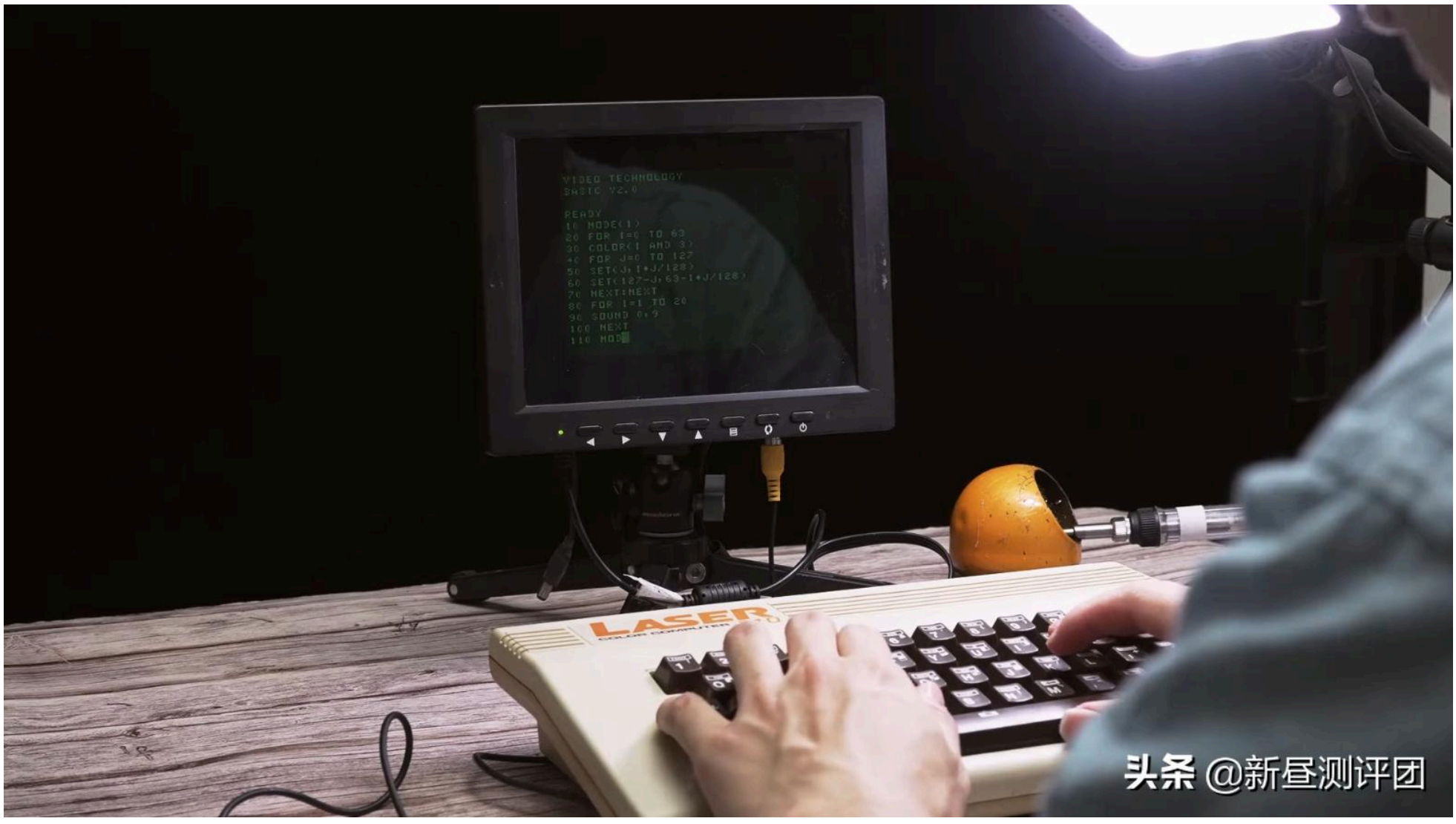


In terms of feel, the experience of Laser310 is definitely not as good as other products that use mechanical keys, because it uses a membrane keyboard instead of mechanical keys. This technology was once popular in cheap models around the 90s because of its thin and light features.



Of course, in addition to using keyboard input, we also have some old ways to transfer games or codes. For example, using a traditional tape recorder. I bought a Sharp CE-152, which is also a product from the 1980s. I will use this thing later. Will use video to explain.

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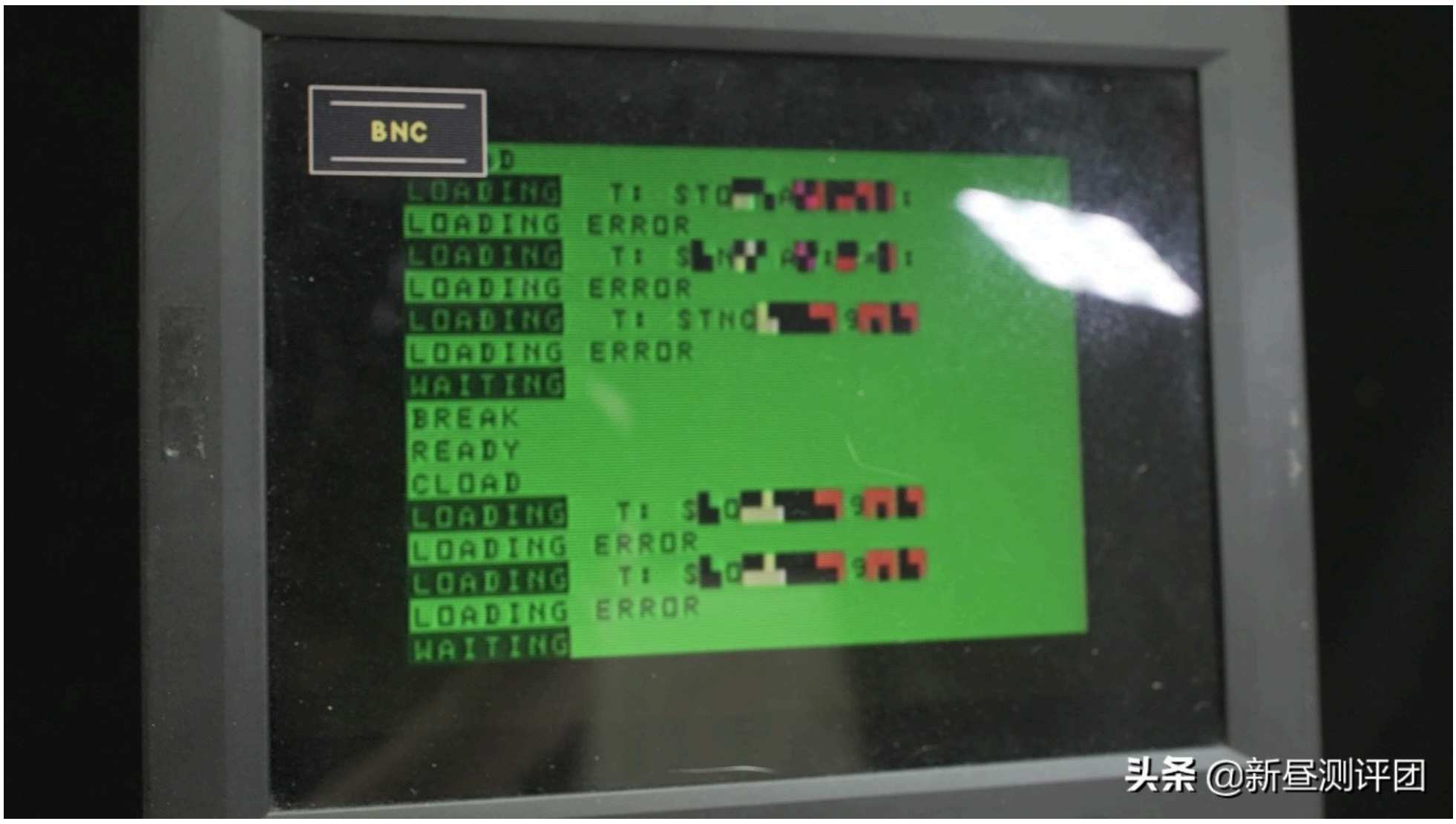
However, although I bought a tape recorder, I found that the compatibility and stability of the tape recorder are different. For example, the output data waveform is unstable due to the rotation speed of the tape, and the Laser310 cannot be easily identified.



Although I have tried to use the constant 1.5V output battery and the external power supply two methods, but this operation finally gave up, of course, there are some inquiring operations I will explain in other articles or videos.

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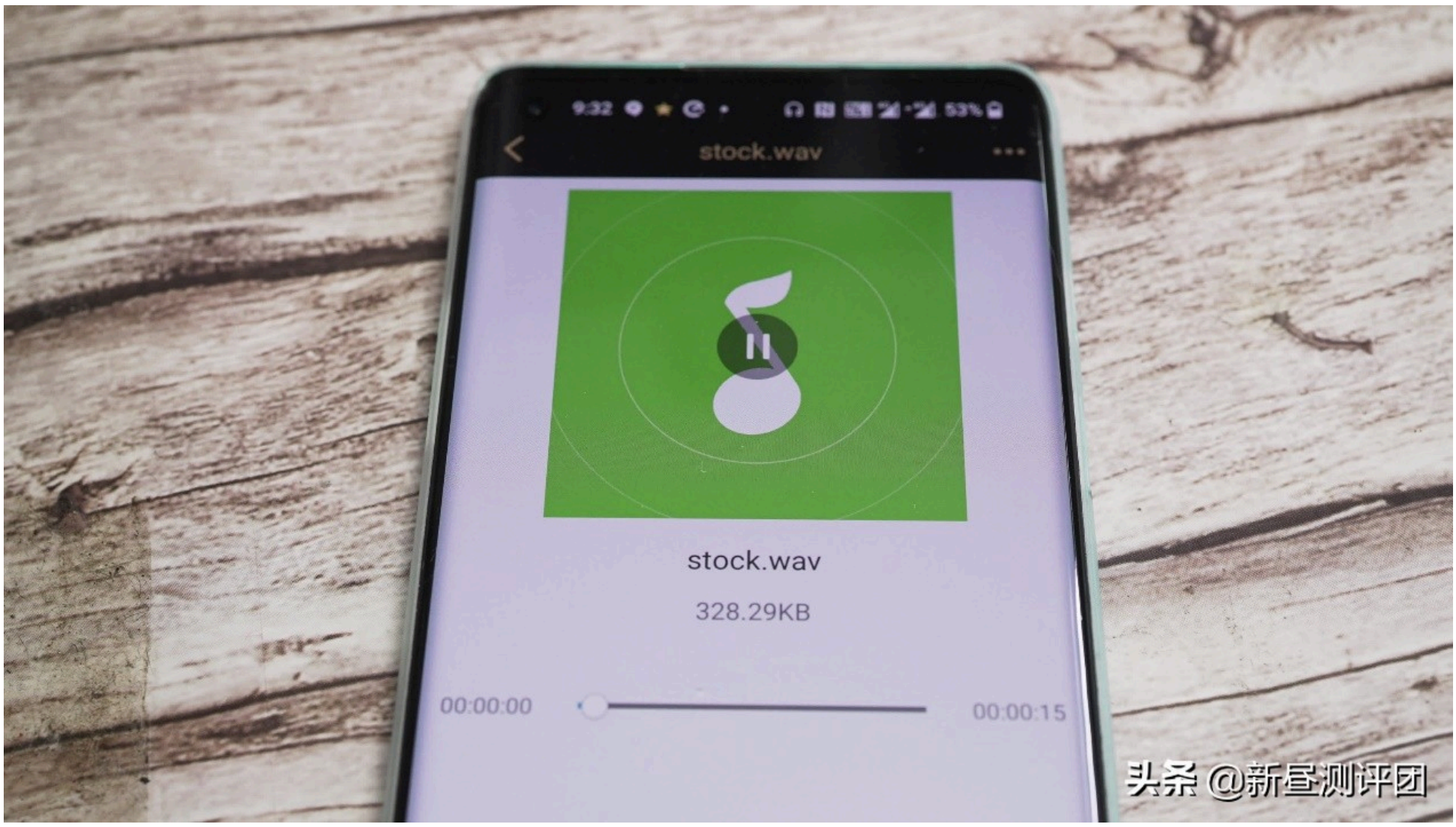
So in the end, we still use mobile phones to transfer data. The specific implementation process can be seen in my video, which uses the audio file of the same code @ Zhang Haobin wrote more than 20 years ago.



2. A try: keyboard puppet system

When I first conceived this device, I was on the Chinese learning machine, because most of the code was too cumbersome to manually enter, I thought maybe I could make a controller, operate the keyboard through the circuit, and simulate the keyboard input, then Using a modern mobile phone, the computer can simply enter hundreds of lines of BASIC code instead of using its own early keyboard.

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BRISBANE VZ USERS WORKSHOP

BRISBANE VZ USER WORKSHOP NEWS

JULY.
Stan Noble demonstrated his VZ Rtty Interface used in conjunction with a scanner.
Stan would like to hear from someone who has one working correctly or had problems as he can only recieve garbled information.

AUGUST.
Larry Taylor demonstrated the Ultra-graphics VZ300 built by Mathew Sorrell. This mod not for the faint hearted.

SEPTEMBER.
Joe Leon from the Hunter Valley group visited and demonstrated his many modifications to his VZ200 an VZ300. A very interesting Gentleman.

OCTOBER.
Ross Woods also from the Hunter Valley group made time during his visit to Expo City to come along to our meeting. This month we had general discussion on Programs. Problems and Groups. We also tried out the System 80 machine that Stan brought along.

The B.V.Z.U.W. would like to hear from Users in the Brisbane area who may have problems and/or solutions .

The B.V.Z.U.W. wish Scott LeBrun well in his future endeavours and welcome Harry Huggins and Ron Allen as the executive of the relocated VZ Down Under Grp.

It is intended this year to run a Mini Expo at the Capalaba High School on Sat. 3 December. This day will be run by the above group and will have various exhibits by members. If you have something you wish to show , bring it along and share it with others.

Eddie Tomes.

MAZE - A GAME IN BASIC

This little programmes is contributed by Mr Darryl G Lynch of 17 Hopetoun St., DUBBO. 2830.

```
100 REM BORDER
110 CLS:SOUND 1,2;3,2;7,2;9,1
120 FOR X=28672TO28703
130 POKEX,191
140 NEXT
150 FOR X=29152TO29183
160 POKEX,191
170 NEXT
180 FOR X=28704TO29120 STEP 32
190 POKEX,191
200 NEXT
210 FOR X=28735TO29151 STEP 32
220 POKEX,191
230 NEXT
240 REM DATA FOR MAZE POKES
250 DATA 38,39,40,41,42,43,44,45,46,47,418,419,420,421,465,466
255 DATA 467,468,272,273,274,275,276,336,337,338,339,340,344
260 DATA 376,408,440,410,411,412,442,443,444,281,282,283,425
265 DATA 426,427,428,429,393,394,395,396,397,360,361,362,60,75
270 DATA 238,270,302,334,366,398,430,234,266,298,330,293,325
275 DATA 357,389,137,139,141,143,145,65,66,67,68,83,84,85,86,87
280 DATA 88,89,147,148,149,150,161,162,163,164,165,166,167,168
285 DATA 186,187,188,189,170,171,172,109,110,111,208,209,210
290 DATA 211,212,81,93,92,98,99,102,105,113,115,116,121,124
295 DATA 136,152,153,175,184,194,193,199,200,205,214,215,219
300 DATA 221,226,227,322,353,236,268,229,323,390,423,262,455
305 DATA 296,332,333,264,431,399,239,372,402,401,436,441,443
310 DATA 445,374,406,438,248,249,278,310,285,317,349
315 DATA 354,355,52
320 REM POKE MAZE DATA TO SCREEN
330 FOR X=1 TO 179
340 READ AX
350 POKE(AX+28672),175
360 NEXTX
365 SC=0:REM SCORE SET FOR START
370 REM TOKEN AND MOVES
375 POKE28705,159:REM HOME
380 T=29125:REM START
400 POKET,42
410 M$=INKEY$:M$=INKEY$
420 IF M$="M"THENGOSUB500:T=T-1:GOTO470
430 IF M$=","THENGOSUB500:T=T+1:GOTO470
440 IF M$="."THENGOSUB500:T=T-32:GOTO470
450 IF M$=" "THENGOSUB500:T=T+32:GOTO470
460 GOTO 410
465 REM CHECK FOR MOVES INTO BORDERS AND FOR HOME BASE
470 IF PEEK(T)=191THENSOUND9,9;9,1;5,5;1,1:GOTO380
480 IF PEEK(T)=175THENSOUND9,9;9,1;5,5;1,1:GOTO380
481 IF PEEK(T)=159THENGOTO520
490 GOTO400
500 POKET,128
502 SC=SC+1:REM MOVES SCORE
505 RETURN
520 REM GAME FINISH
525 SOUND 1,1;1,2;3,4;5,6;7,1;1,9;7,2;4,9;1,1;1,1;1,1;1,1
530 CLS:PRINT@230,"YOU MADE IT"
531 PRINT:PRINT@262,"IN ONLY ";SC;"MOVES"
532 IFSC=77THENGOSUB540:FOR X=1 TO 5000:NEXTX:REM DELAY
535 CLS:SOUND6,9;7,8;1,1:GOTO530
540 PRINT"[redacted]"
545 PRINT"[redacted] THATS TOP SCORE [redacted]"
550 PRINT"[redacted]"
555 RETURN
```

头条 @新星测评团

The resistors below are the input part of the keyboard and the position I want to manipu

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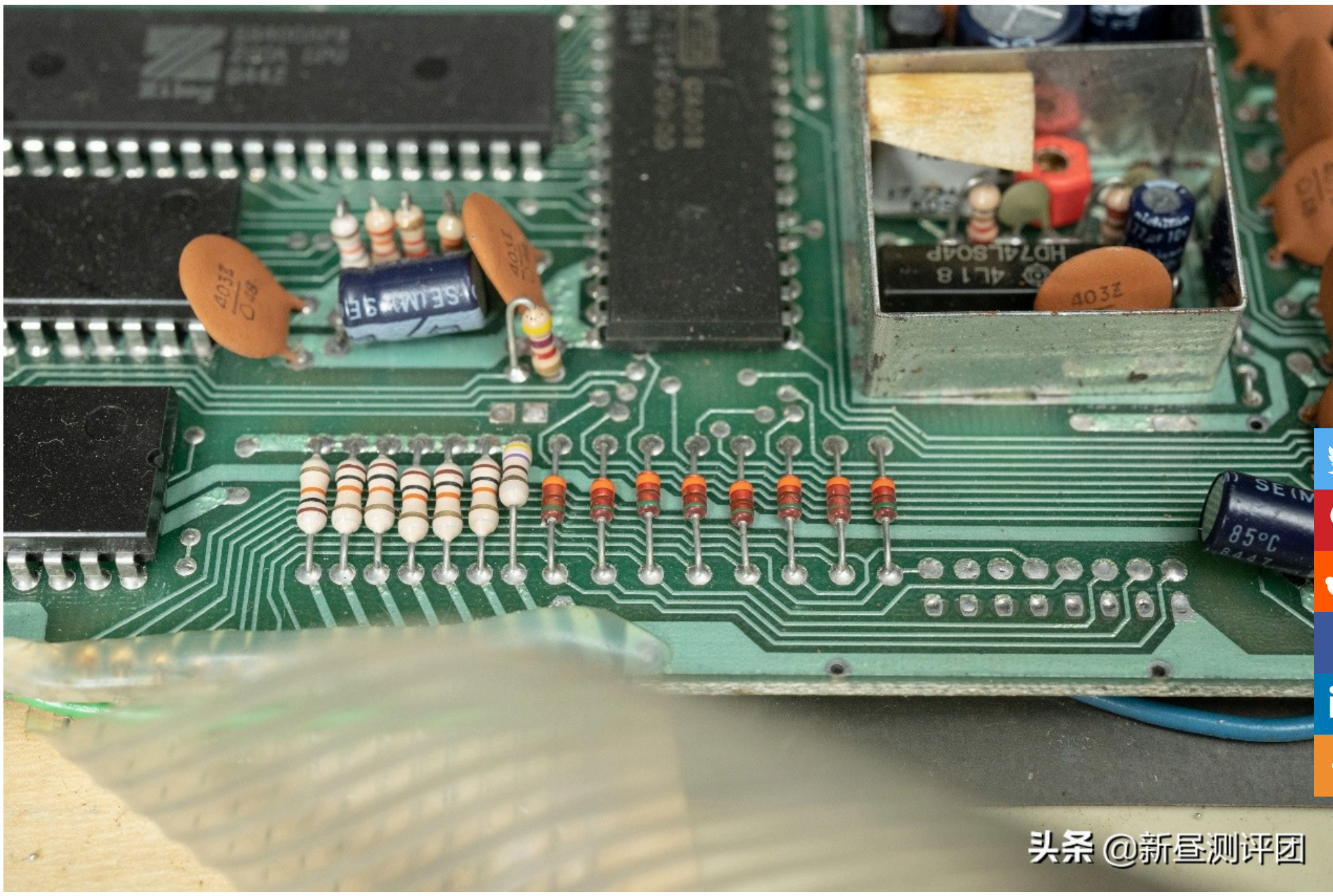
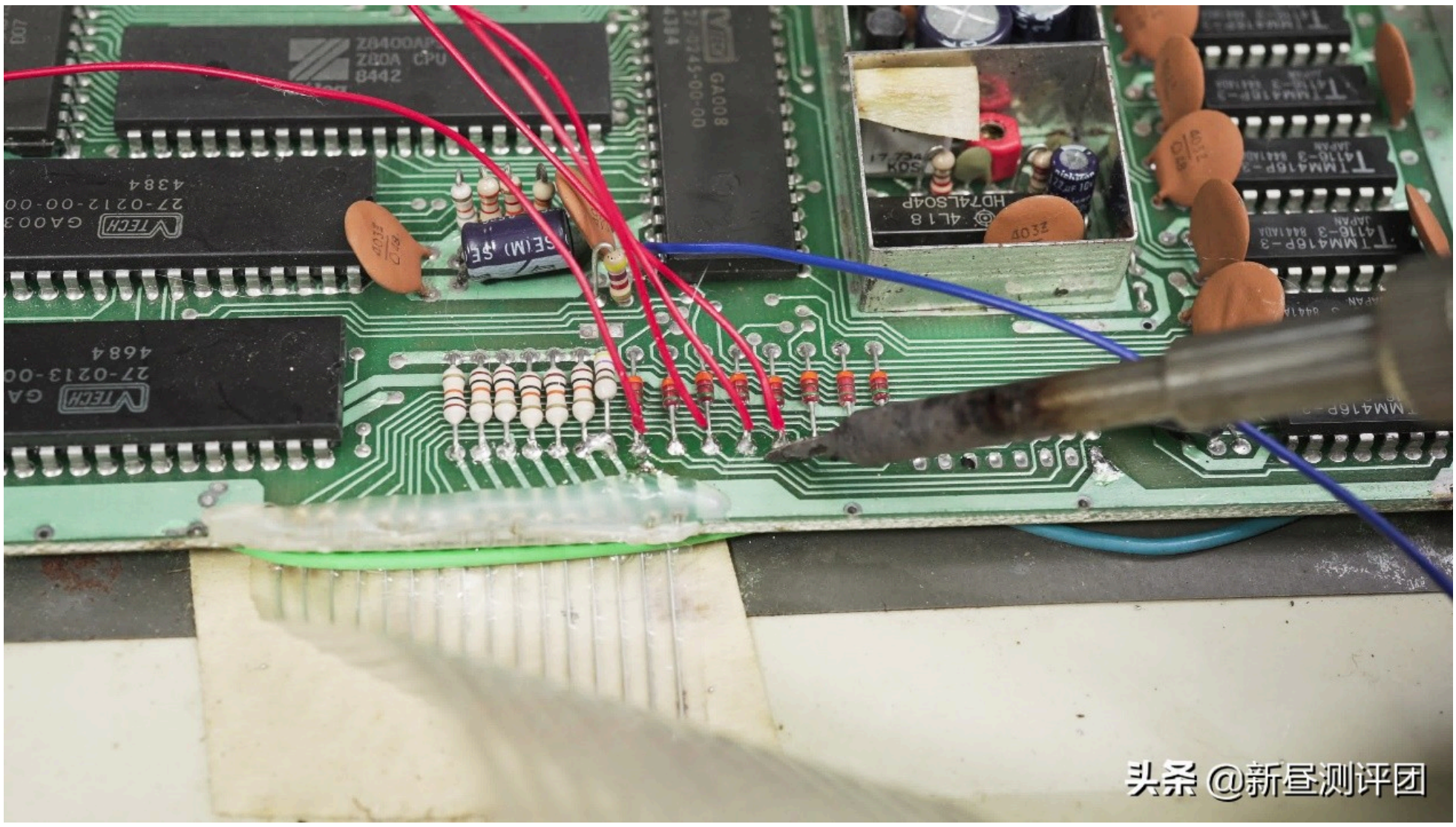


At the beginning, I soldered some pins on the keyboard and found that soldering directly on the motherboard would be more useful.



This keyboard is a matrix keyboard, and then a 6*8 matrix, which means there will be 48 keys in the theoretical design, of course the actual keys used are 46

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During the test, I always feel that something is wrong. For example, the measured signal jumps badly. The 8 diodes measured regular but chaotic pulses. There are two possibilities for this situation. The first one may be that my meter is not working. , There is another possibility that this keyboard scan design is like this.

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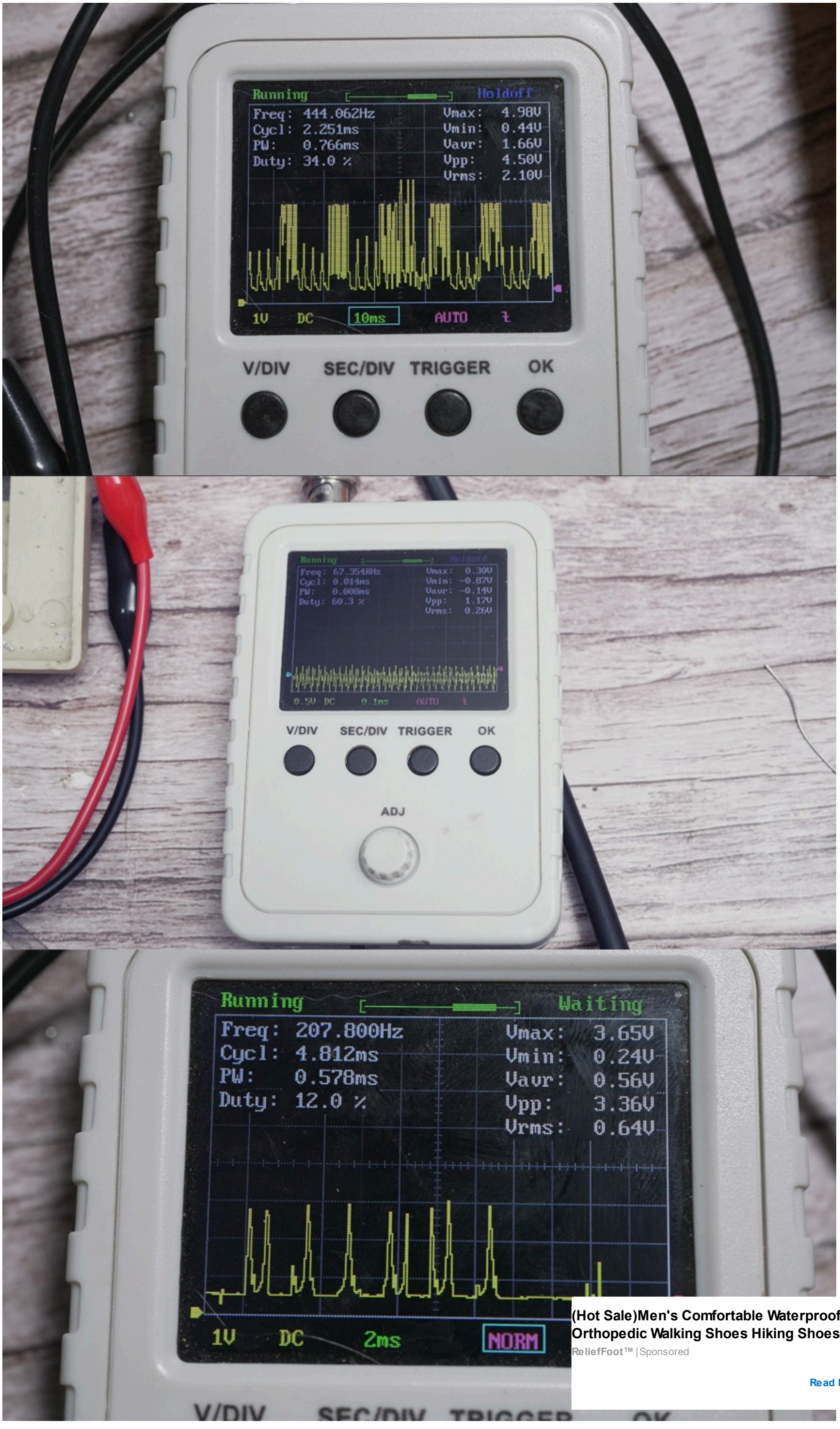

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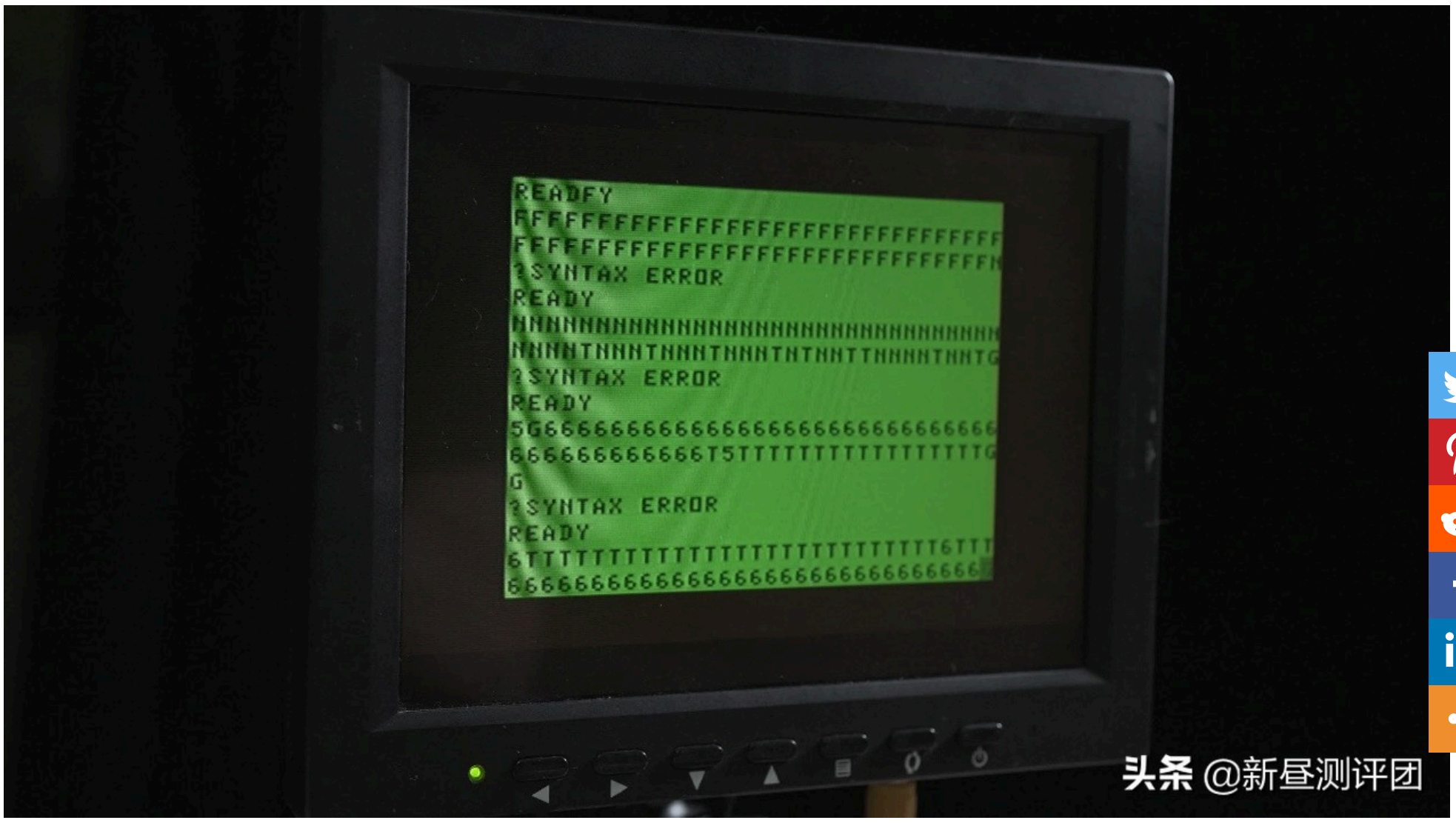
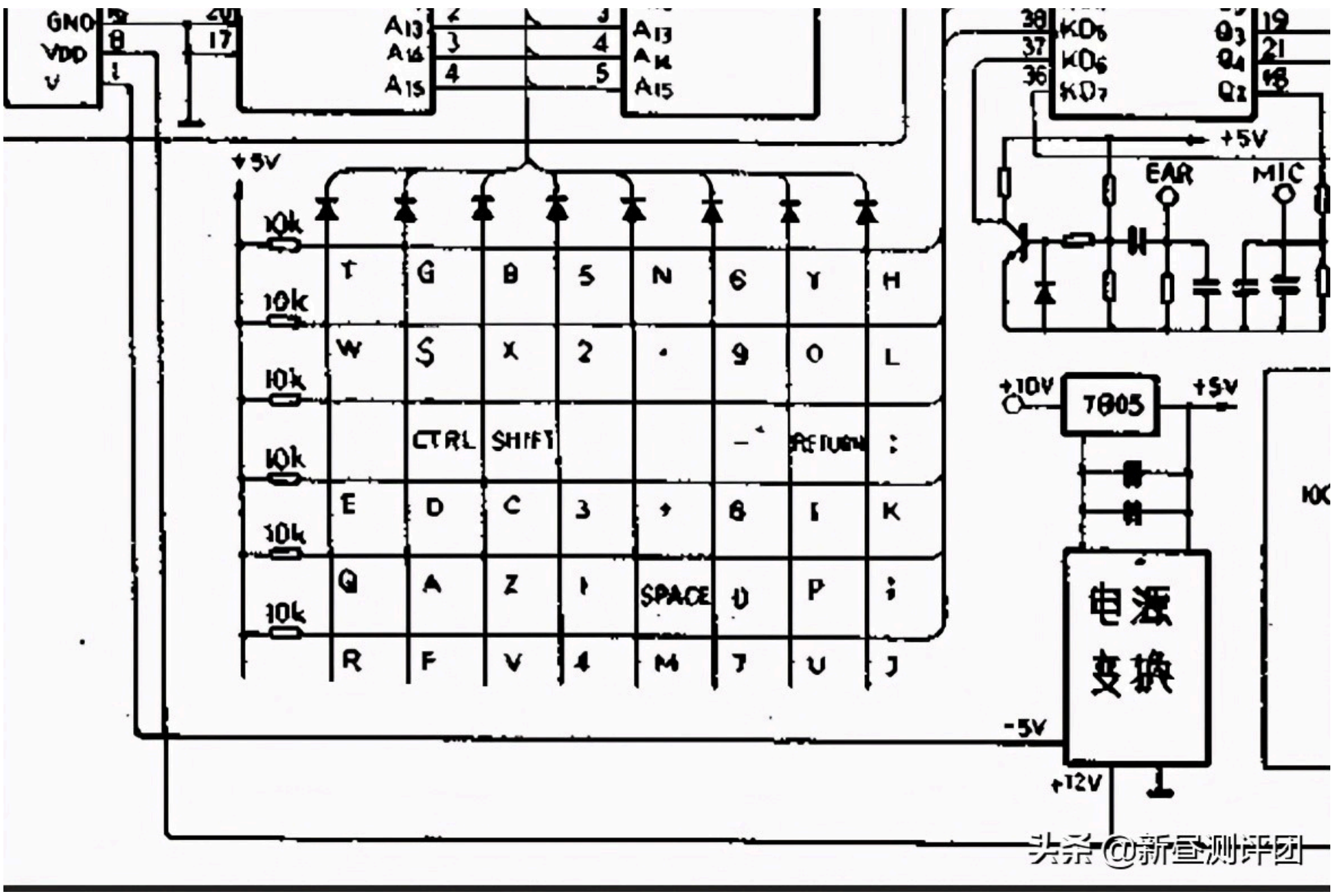
In the end, I found that this was the case. Then I tried the analog signal to see if I could use a square wave to achieve the same effect as the analog signal provided by the host. Finally, 4 letters were measured on each pin, and the others It can't be achieved at all.



After the experiment, the final conclusion: This keyboard uses analog signals to scan the keyboard to achieve key functions! This is very different from modern keyboards and other keyboard scanning.



I thought it would be fine to use a digital signal to intervene, but now it can only be com imitate all the 48 buttons, so this circuit is built.

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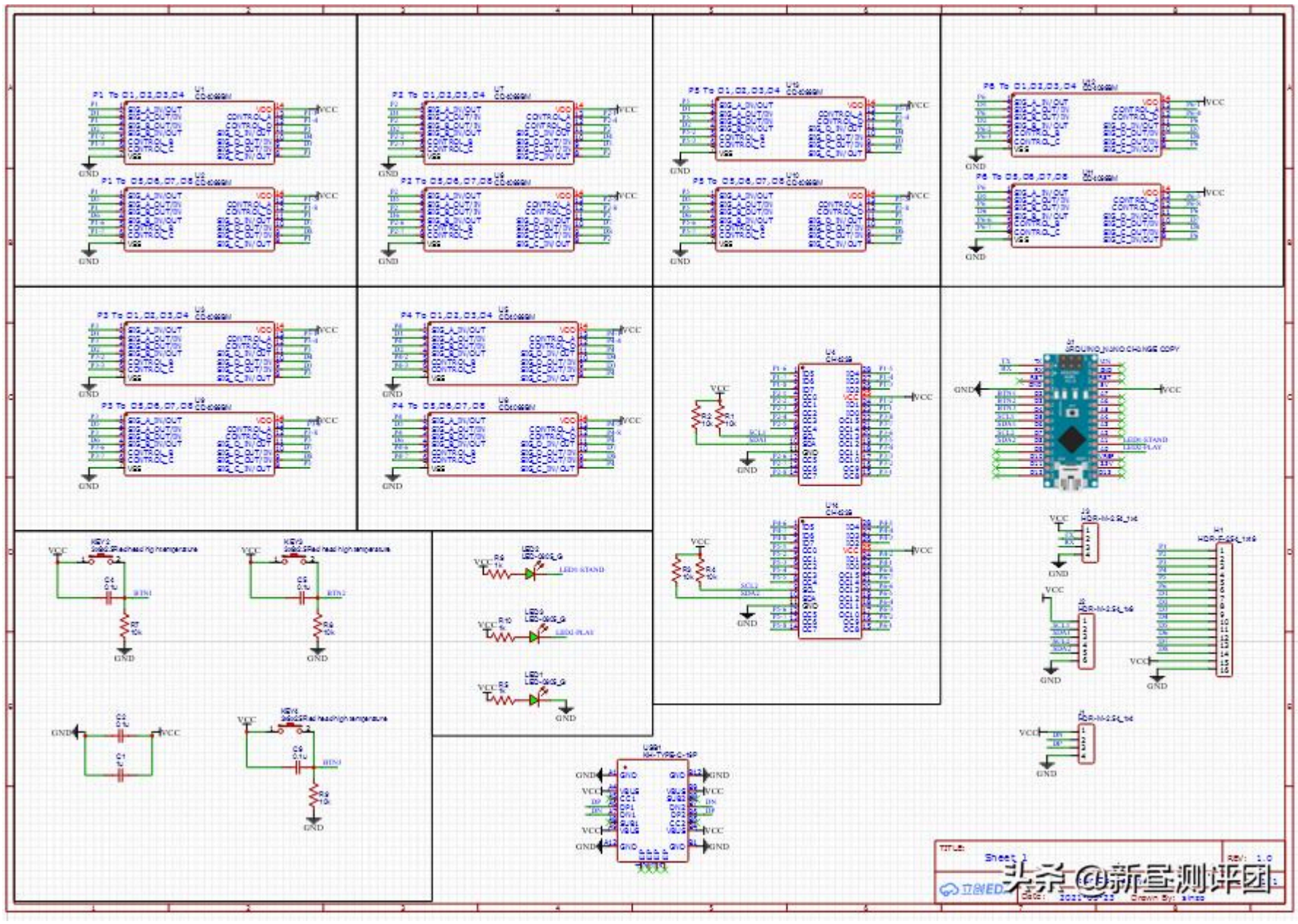
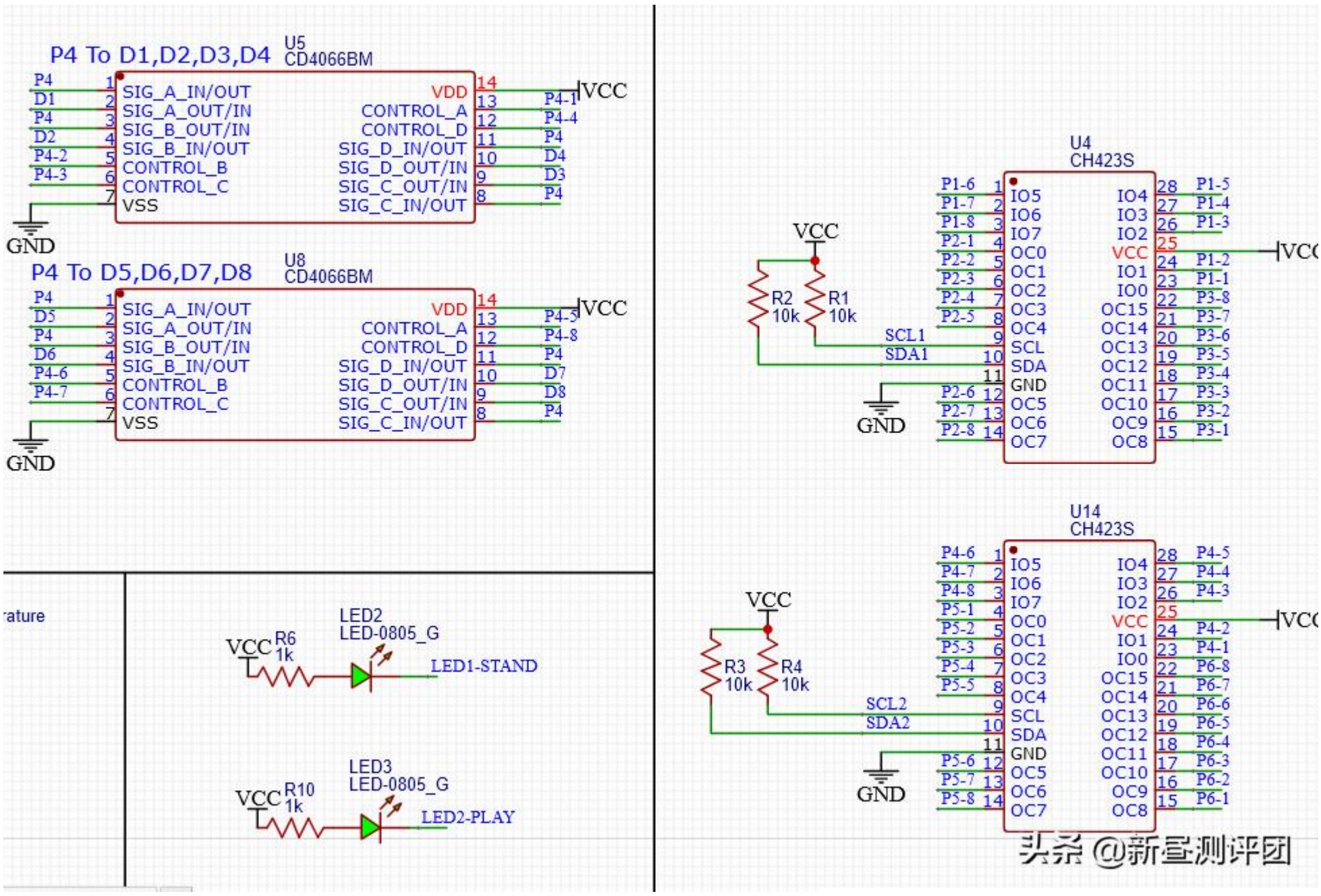


It itself is a soft switch. I use two CH423 chips to control 12 CD4066BM chips to control all the keys. The CD4066 chip can control the connection or disconnection of two lines in both directions.



A few days later, I received the designed circuit. I am personally satisfied with its appe because it was proofing.

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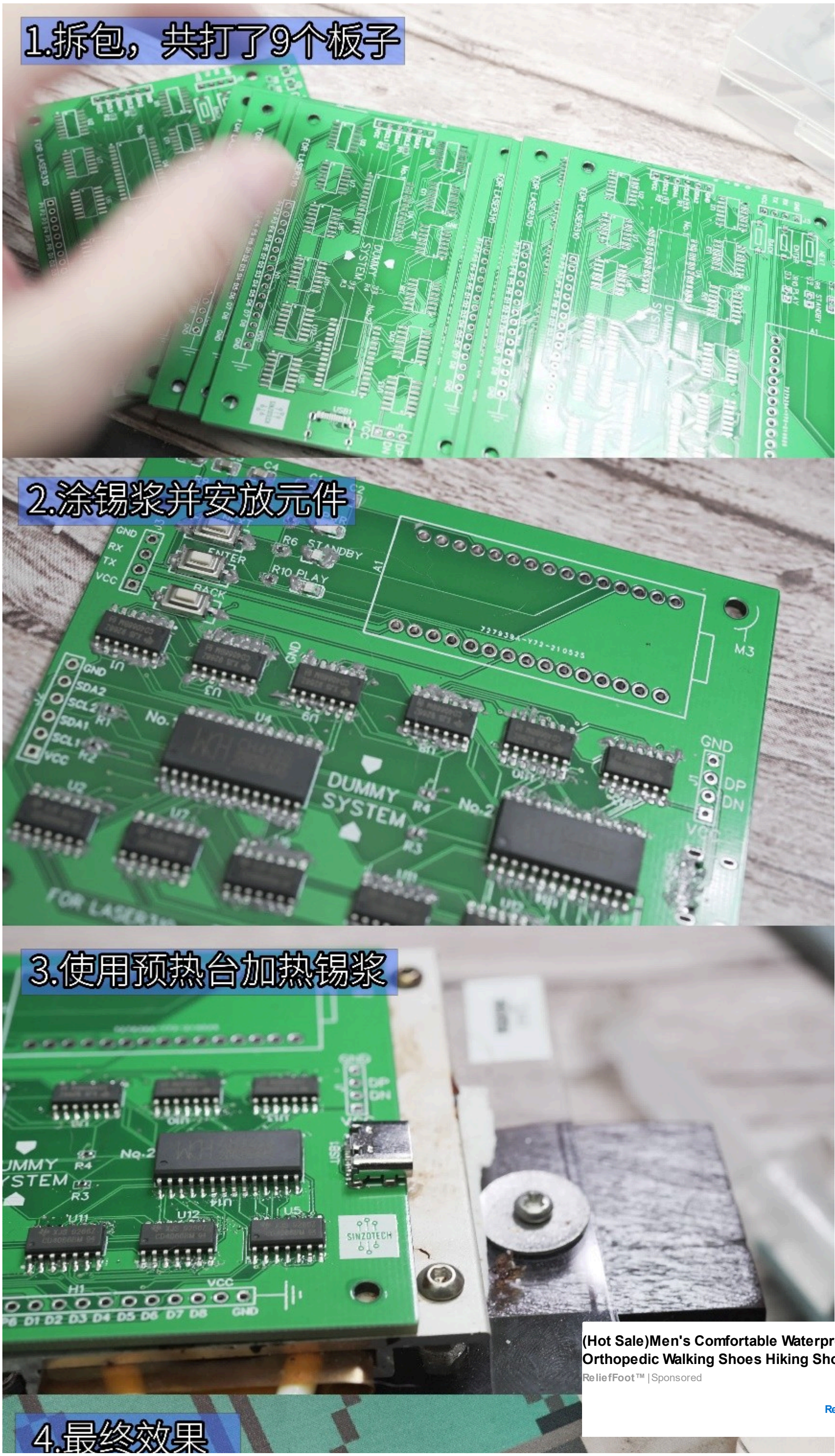

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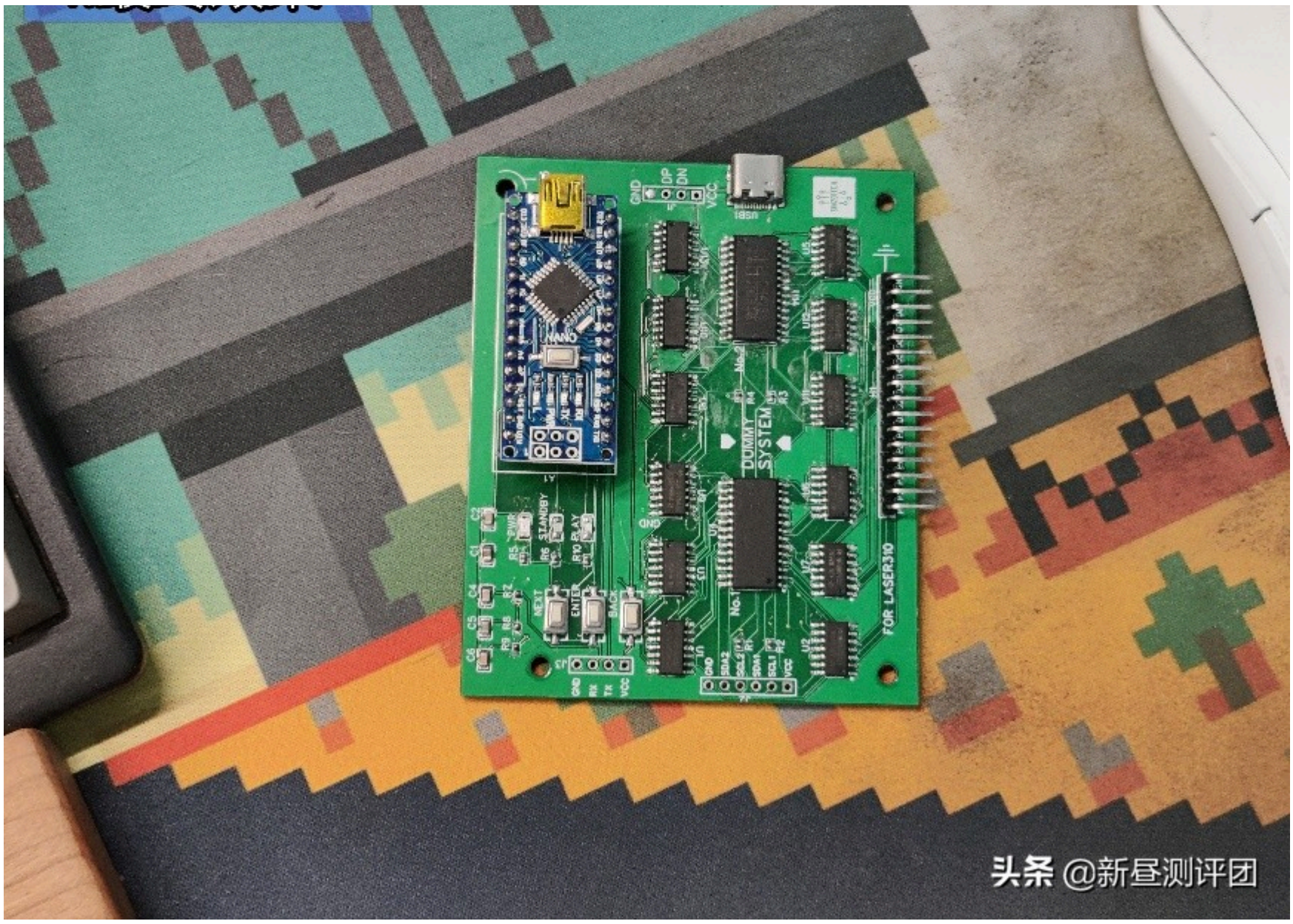

Next is the testing and software writing. It went smoothly. The board seemed to be in place, and the pin outputs were all normal. In terms of software functions, in addition to the initial serial control, the planned function also adds automatic input. For example, I built a code for bee-playing game. After pressing the button, it will automatically "play" the set button and input the code into Laser310.

What is the level of computers designed and produced in Hong Kong 36 years ago?Laser310 and VTech

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Although I thought well, this design failed to be implemented normally in the end.

The reason is that even if it is a modern chip, the resistance of the CD4066 is still tens of ohms. After trying to connect to the Laser310, it is estimated that the output power of the chip used to judge the keyboard button is too small (just those Waveform), so this small tens of ohms makes the waveform unable to be transmitted normally, which causes the entire keyboard puppet system to not work as expected.

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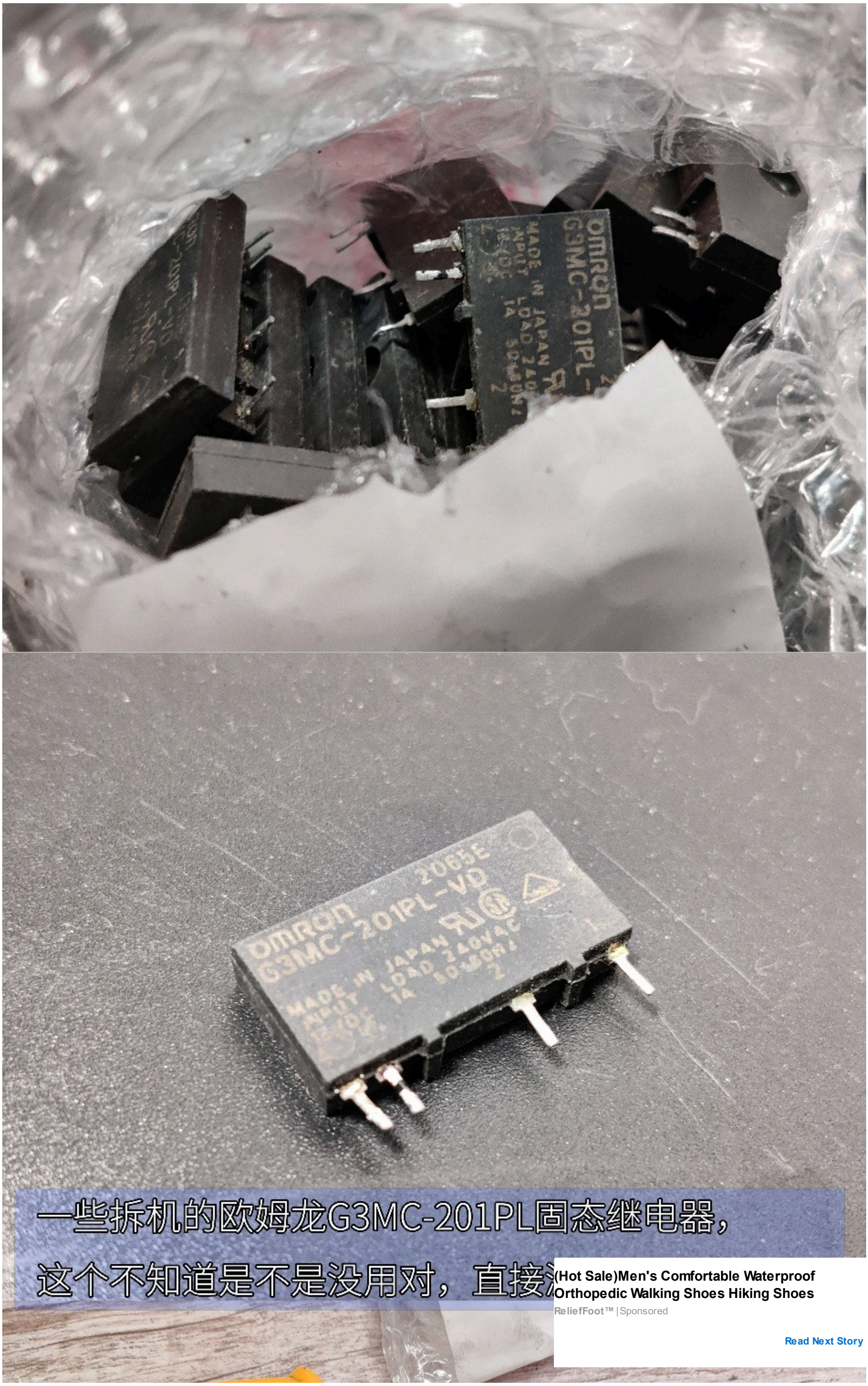

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Later, I thought about some methods, such as using solid state relays. After buying dozens of them in a hurry, I found that the parameters were wrong, and the driving voltage was 12V.

So although this system is theoretically feasible, it can only be realized if there is an electronically controlled switch solution that satisfies ultra-low resistance and no electromagnetic induction. In addition, it is not simply connected to a high level or a low level, so the hardware is more difficult. If you know how to solve it, I look forward to your suggestions in the comment area.

3. Memory about Laser310

Enough information about Laser310 has been exposed, but some content is not detailed enough. For example, what is the status of such a machine more than 30 years ago? In addition to many other questions, it is difficult for me to find out on the existing network. It is better to ask people who have used it before.

This time I interviewed two friends who had used Laser310 in the past. They are @Bai Guangguang, and @ are trying hard to play Saburo. I would like to thank @Gao Xubo for his assistance.

The following drawings are added later for easy reading.

Bai Guangda's memories of Laser310

Laser310 was used in elementary school, in the second and third grades of elementary school. At that time, the elementary school had a computer room for hobby group activities.

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Now I think of this because Laser310 is relatively cheap, so it is used more. At that time, there was an Apple II in our elementary school with an external disk drive.

At that time, the Apple II was a black and white display, and the Laser310 was a green display. There were more than a dozen units in the computer room. It was about 1987-88.

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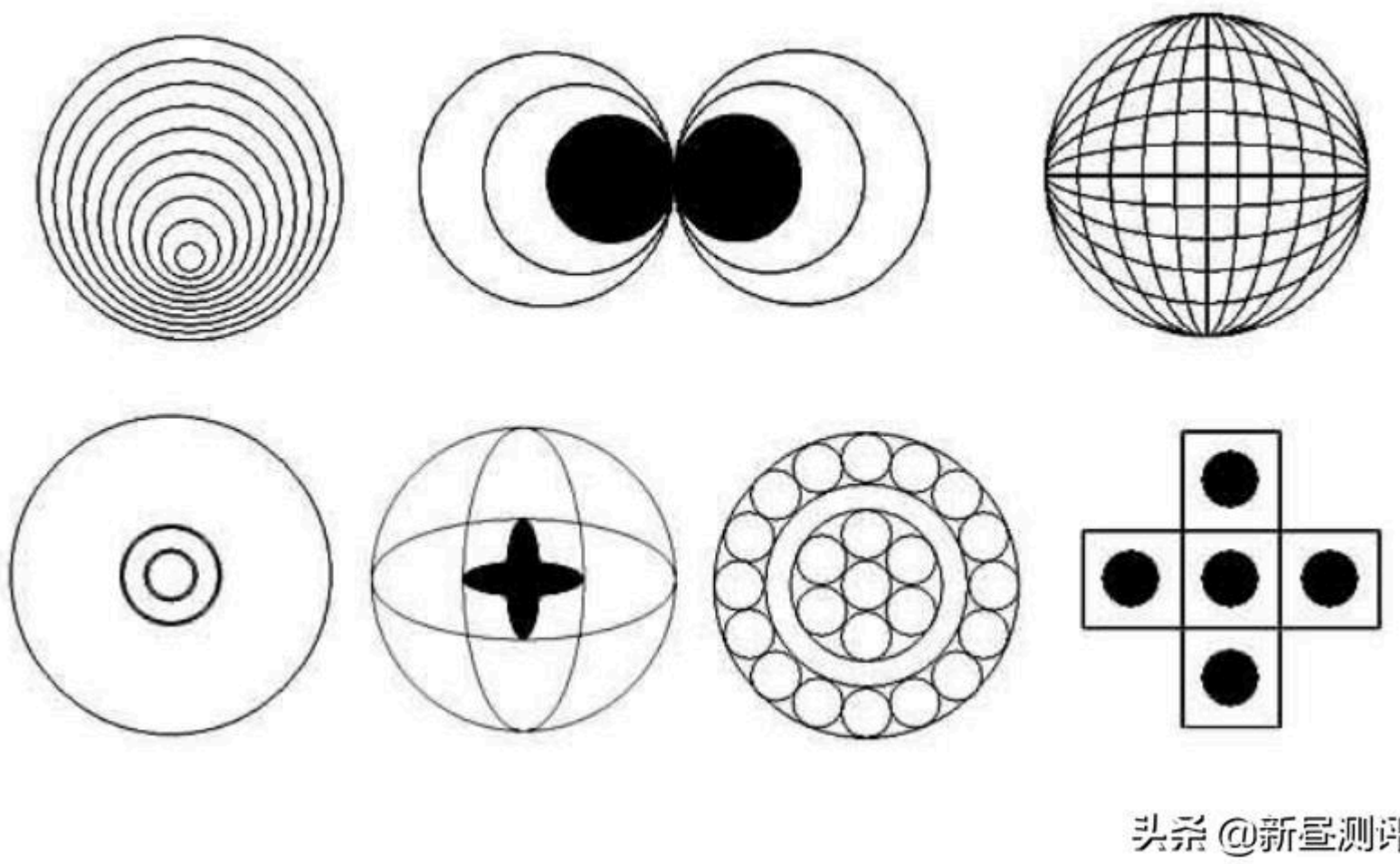
We were learning BASIC on this machine at that time, because there was no Hanka saying at the time, and computers could not input Chinese characters, so we first learned from the BASIC command, and then learned the LOGO and the gameplay of drawing with turtles.



There is a BASIC tutorial textbook for elementary school. Later, advanced children will use this to compile some simple programs to present images. In fact, there are not many complicated applications, because the ability of this machine is very limited.

Apple II is only used by teachers. Sometimes the teacher will connect to the disk drive to demonstrate a few games when he comes, but I have forgotten what the game is for a long time. The remaining memories feel like the Mario brothers generation, that is, the water pipe. Top tortoise.

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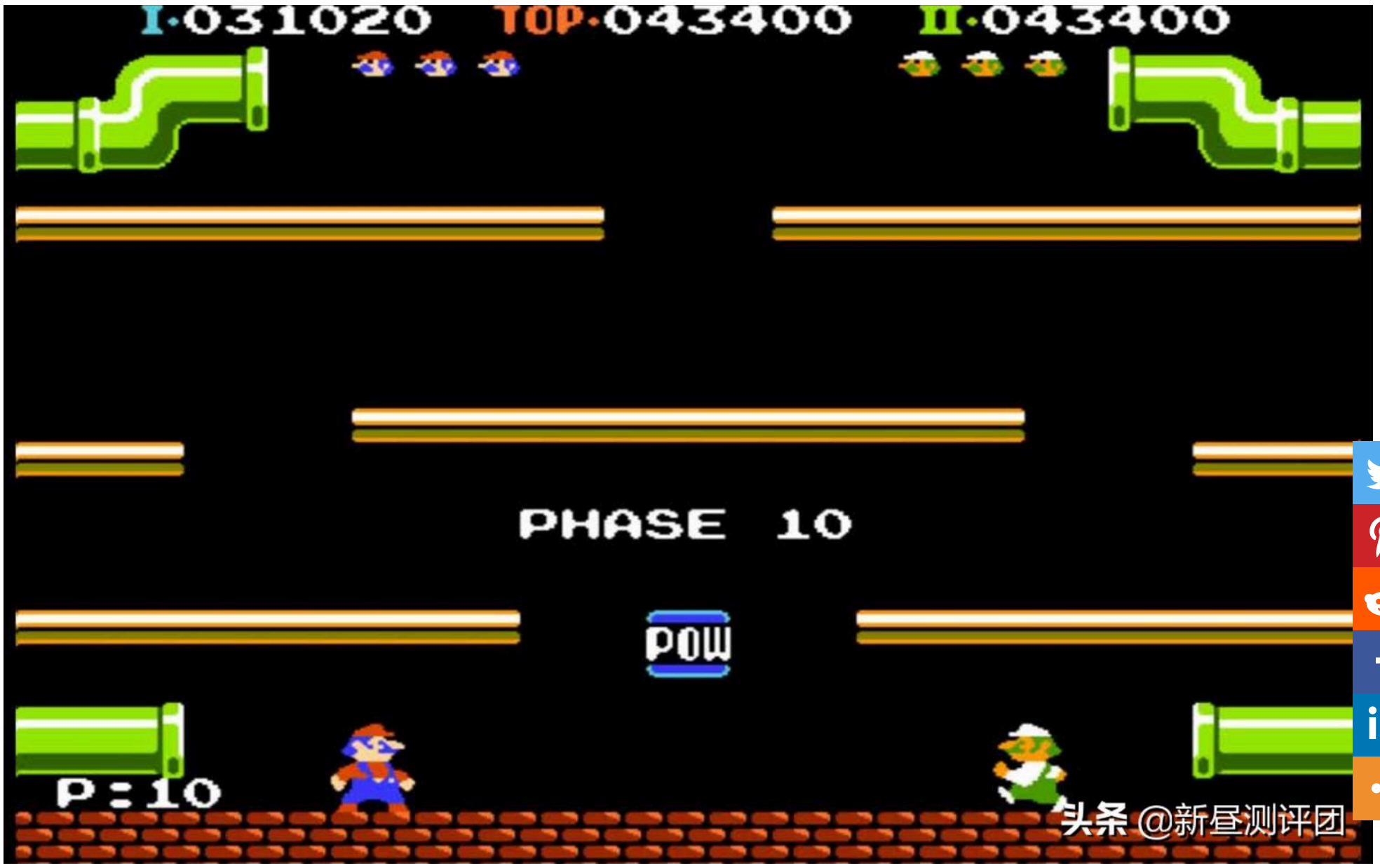

Compared with Apple II, 310 did not have a tape drive at the time. It may be because the tape drive was more expensive. The first time I saw the tape drive was in 1990. At that time, the bank used the tape drive. Someone took elementary school students to visit and see it. , The bank should use IBM PC XT

I also demonstrated text input. At that time, there were natural codes and four-corner codes. The four-corner codes were four digits to define a Chinese character, probably for the convenience of bank staff to enter quickly. Later, I learned Wubi after going to junior high school, about 1993

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單字四角號碼索引

四角號碼檢字法

第一條　筆形分爲十種，用0到9十箇號碼來代表：

號碼	筆名	筆形	舉例	說明	注意
0	頭	亠	言主广扌	獨立的點和橫相結合	1 2 3 都是單筆，0 4 5 6 7 8 9 都由二以上的單筆合爲一複筆。凡能成爲複筆的，切勿作單筆；如亠應作0不作3，宀應作4不作2，厂應作7不作2，冖應作8不作3、2，小應作9不作3、3。
1	橫	一 丶 乚 乙	天土坡元風	包括橫、挑(趯)和右鉤	
2	垂	丨 丿 亅	山月千則	包括直、撇和左鉤	
3	點	丶 乀	亠礻冖厶之衣	包括點和捺	
4	叉	十 乂	草咨皮刈對	兩筆相交	
5	插	扌	打戈中史	一筆通過兩筆以上	
6	方	口	國鳴目四甲由	四邊齊整的方形	
7	角	亠厂扌乚亠冖	羽門厄陰雪衣學罕	橫和垂的鋒頭相接處	
8	八	八 冖 八 灬	分頁羊余災氽足午	八字形和它的變形	
9	小	小 灬 灬 忄 扌	尖彡舞累惟	小字形和它的變形	

第二條　每字只取四角的筆形，順序如下：
(一)左上角　(二)右上角　(三)左下角　(四)右下角

(例)　(一)左上角 — 端 — (二)右上角
(三)左下角 — 端 — (四)右下角

檢查時照四角的筆形和順序，每字得四碼：

(例)　顏=0128　藏=4325　烙=9786

第三條　字的上部或下部，只有一筆或一複筆時，無論在何地位，都作左角，它的右角作0。

(例)　宣　直　首　冬　軍　宗

每筆用過後，如再充他角，也作0。

(例)　成　持　掛　十　車　時

第四條　凡外圍是口門門的三類字，它們的下角改取內部的筆形，但上下左右有其他筆形時，不在此例。

(例)　因=6080　閉=7724　鬧=2212

茵=4460　瀾=3712

头条 @新量测评团

When I was in elementary school, the only thing I saw was Laser310. Some very sophisticated or wealthy people had Chinese learning machines at home, but I only saw them twice. The threshold for learning machines is much higher than that of 8-digit Nintendo.

When you study in junior high school, you have a wider choice of space. There are XT/AT and 286. The teacher uses a 386 color monitor.

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Apple II should have seen a relatively high-end model, and I have not seen the original Macintosh when I was young.

Question: Where will this computer be sold?

My guess is a guess, because in the 1980s, Hong Kong and Taiwan were the hardest hit areas for chip and compatible machine dumps, so many chips in addition to Taiwanese products will flow into Hong Kong, then assembled into compatible machines in Hong Kong, and then brought to the mainland by Hong Kong companies. Coming to sell is actually a bit similar to the relationship between "Little Genius", "Shengtian" and "Nintendo", that is, just pick it up and change the production code.

Compared with vz300, the overall layout of laser310 is basically consistent

For teaching in primary and secondary schools, this should be the unified procurement by the education committees of each city, or the provinces will issue indicators and then purchase. As for Apple, I think it is likely to be the original product.

Later, the era of IBM compatible computers was almost before the mid-90s. By 1997, I was already able to install the computer by myself, so after that, it was a trivial matter.

Desperately playing with the memories of Saburo and Laser310

The first contact that year was elementary school, and the impression was that it was the fifth grade of elementary school, but it was not that the school curriculum was bought at home. I don't remember the specific source, but it's definitely not a department store. It may be some computer stores in Guangzhou.

The cause and consequence are: my brother had a computer class in middle school and joined the computer interest group. They use an Apple II compatible computer at school and want to buy a computer for the convenience of studying at home. But the compatible machine was too expensive, so I bought the Laser 310 next.

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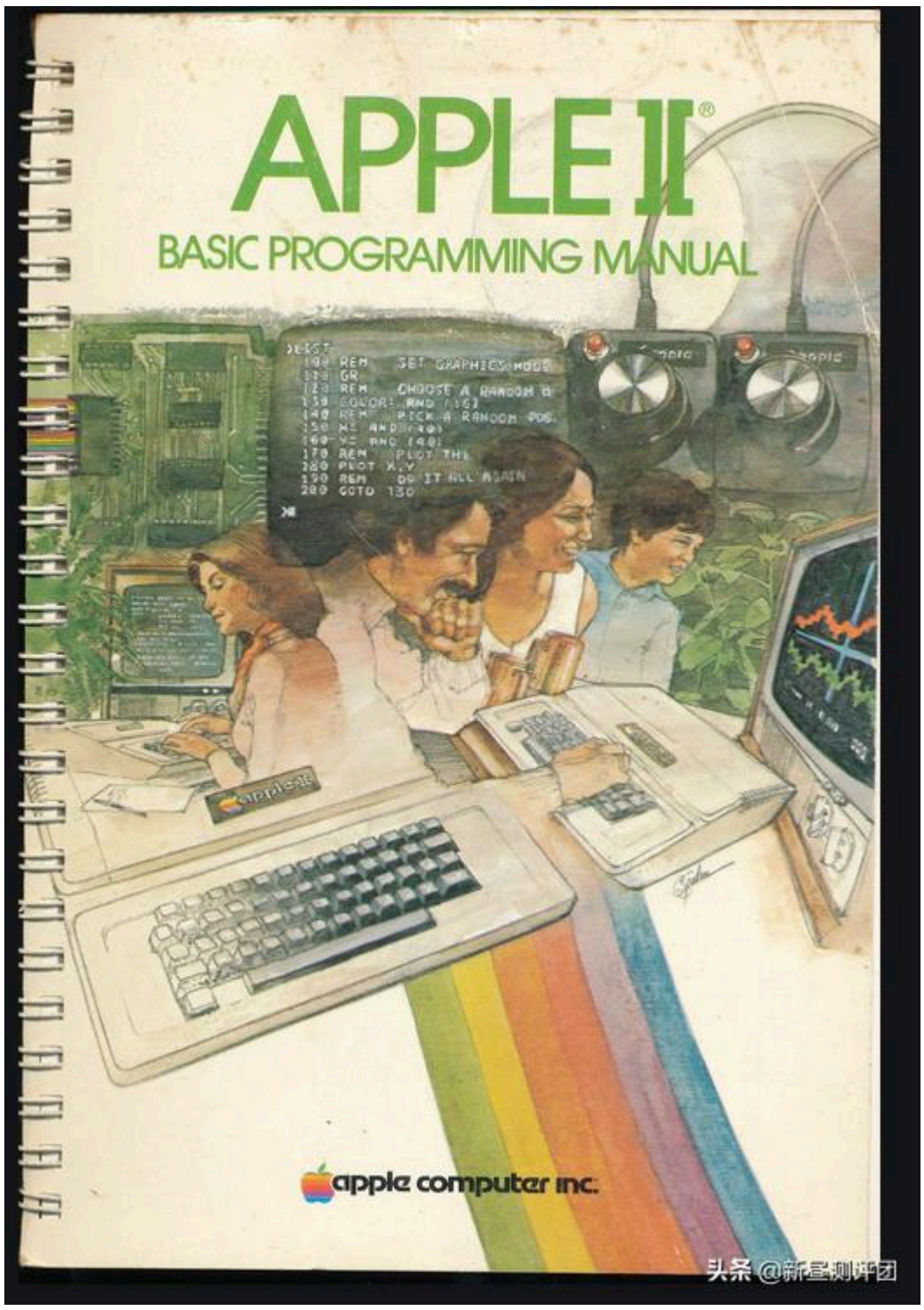
Compared with Apple ii, there is a big difference in memory, display resolution, and running speed, which is low-end. In addition, in the Basic language, there are no commands, but I don't remember which ones they are. Therefore, some of the slightly more complicated Apple II Basic programs seen in the book cannot be run directly when typed in.



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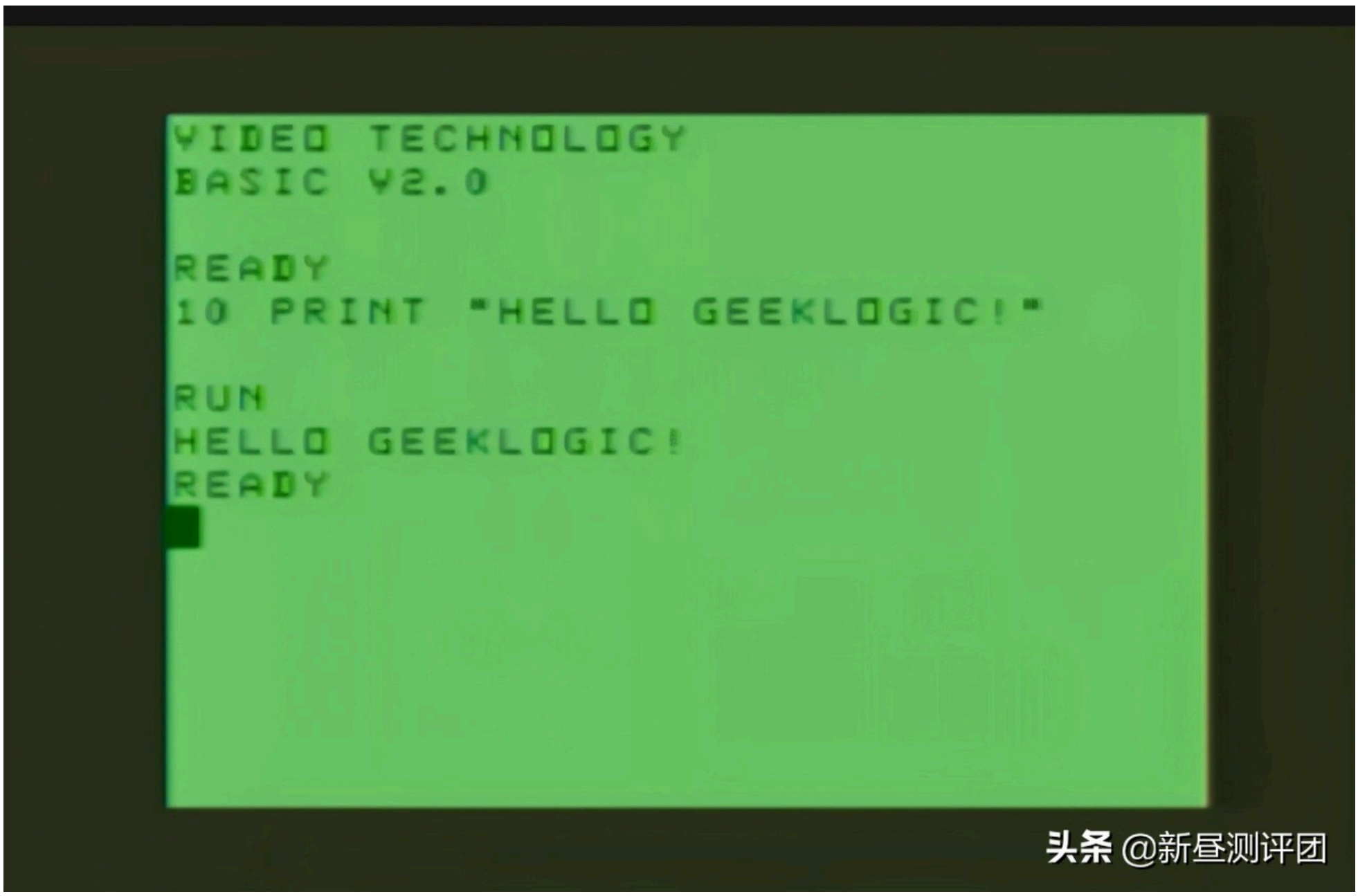
The Laser 310 is the first computer I have seen. It was the first time I saw it, and I was in a strange mood. I am excited to find that I can control the content displayed on the screen (that is, when I type on the keyboard myself, the words can be displayed on the screen)



Later, I read the book by myself and learned programming (and my brother also gave some guidance) to the point where I could write some small games by myself. The most impressive is a platform jumping game. You can produce random levels by yourself and jump up layer by layer.

At the beginning, there is no storage device, and the program has to be re-entered eve
save the program to tape.

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At that time, using tape to store the program, I thought it was amazing. Because the recorder is not the original one, you need to adjust the volume to read the program normally. Too big is not good, too small is not good, debugging for a long time. The shape of the recorder is a kind of brick machine, made in China.

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At that time, I found the digital record on the tape recorder to be useful for the first time. It was the 999. Used to locate the program. In fact, positioning songs is also possible, but I didn't use it when I was young, hahaha.

Later, my brother bought a broken plotter in the junk market, repaired it by himself, and can print some patterns, which is very interesting. I also bought back these peripherals this year, including plotters and disk drives, but did not try them out and set them as the main ones.

In Laser 310, you can directly input some grid symbols on the keyboard to spell out some patterns in the text state, but there was no concept back then. I couldn't spell out anything by myself. I didn't understand it until I grew up.

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What is the level of computers designed and produced in Hong Kong 36 years ago?Laser310 and VTech

I have seen some games and statistical programs spelled out with these patterns (tabs), and I thought it was gorgeous and magical at the time. Can be used to draw tables, can also be used to draw graphics. The processing speed of the text state is higher than that of the drawing state, and some animation effects can be achieved.

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I have played an airplane game in the text state, which is actually using graphics to spell out the pattern of the tail. I think it is very rough now, but I felt shocked at the time. Another is the game in the drawing state, controlling the cannon to knock out the flying aircraft.

What is the level of computers designed and produced in Hong Kong 36 years ago?Laser310 and VTech

I was very depressed at that time, because the game was written in assembly. Although running speed was too slow to play.

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The assembly is input through the POKE statement, which is to directly modify the data of the memory address. I didn't understand it at the time, but I can understand it now. (Picture, VZ300 address and function correspondence table)

VZ200/300 Quick Reference Card

By Leslie Milburn

Memory Map

Address		Description
Dec	Hex	
0	0	BASIC Rom *(Level II Standard)*
8192	2000	BASIC Rom *(VZ Extensions)*
16384	4000	Reserved for Cartridges *(DOS, Word Pro, Terminal, RTTY)*
26624	6800	Memory Mapped I/O *(Keyboard, Cassette, Screen, Speaker)*
28672	7000	Video Display Ram
30720	7800	Communications Region *(See Page 2)*
31465	7AE9	Start of User Memory
36864	9000	End of 6K System *(VZ200)*
44874	AF4A	End of 16K System with DOS *(VZ300)*
45184	B800	End of 16K System, No DOS *(VZ300)*
53038	CF2E	End of 24K System with DOS *(VZ200 + 16K)*
53348	D000	End of 24K System, No DOS *(VZ200 + 16K)*
63138	F6A2	End of 32K System with DOS *(VZ300 + 16K)*
63488	F800	End of 32K System, No DOS *(VZ300 + 16K)*
65525	FEC9	End of 64K System with DOS *(VZ + 64K)*
65535	FFFF	End of 64K System, No DOS *(VZ + 64K)*

Port & Memory Mapped External Devices

Port *(Hex)*	Memory Addr *(Hex)*	Description
00 - 0F	-	Printer Interface *(Input/Output)*
01	-	8 Bit General Port *(Input Only)*
10 - 1F	-	Disk Controller *(Input/Output)*
20 - 2F	-	Joystick *(Input Only)*
	7000 - 77FF	Super Graphics *(Output Only)*
30 - 3F	?	Communications
40 - 4F	?	Light Pen *(Input Only)*
50 - 5F	-	Real Time Clock *(Proposed)*
60 - 6F	-	External Keyboard *(Input/Output)*
70 - 7F	C000 - FFFF	Main Memory Bank Switch *(Output Only)*
C9 - CA	?	Eprom Programmer
D8 - E7	8000 - 9FFF	Auto Boot *(Proposed)*
E8 - F7	6000 - 67FF	RDOS *(Proposed)*
F0 - F3	?	24 Bit I/O Interface
F8 - FF	4000 - 5FFF	Ram Disk *(Proposed)*
E0 - FF	?	D. Newcombes Rom Board
FE	?	4K-64K Ram/Eprom

- 1 -

Communications Region

Address		Description
Dec	Hex	
30720	7800	RST Instruction Vectors
30741	7815	Keyboard Device Control Block
30749	781D	Video Device Control Block
30757	7825	Printer Device Control Block
30774	7836	Keyboard Work Area
30779	783B	Copy of Output Latch/Video Background (*32 = Green, 48 = Buff*)
30845 - 7	787D - F	Interrupt Exit
30862 - 3	788E - F	USR Subroutine Address
30864 - 6	7890 - 2	RND Number Seed
30874	789A	Error Code Storage. *(See Page 4)*
30876	789C	Output Device *(0 = Video, 1 = Printer, 255 = Cassette)*
30880 - 1	78A0 - 1	BASIC Stack Address/ Lower Boundary of String Space
30882 - 3	78A2 - A3	Current BASIC Line N°/ Address of line with Error
30884 - 5	78A4 - 5	Start of Program Pointer
30886	78A6	Cursor Tab Position
30895	78AF	Variable Type in WRA1 *(2 = Integer, 3 = String, 4 = Sng Precison, 8 = Dbl Precision)*
30897 - 8	78B1 - 2	Top of Memory Pointer
30938 - 9	78DA - B	Line N° of Last Data statement read
30954 - 5	78EA - B	Line N° in which error occurred.
30969 - 70	78F9 - A	End of BASIC Program Pointer/ Start of SimpleVariables Table Pointer
30971 - 2	78FB - C	Start of DIM Variables Table Pointer
30973 - 4	78FD - E	Start of Free Memory Pointer
30975 - 6	78FF - 900	Pointer to Data Item Read
30977-1002	7901 - 1A	Variable Declaration Table *(26 Entries)*
31003	791B	Trace Flag *(0 = Off, 1 = On)*
31004 - 57	791C - 51	Reserved for Numeric Routines. e.g. Working Register Areas *(WRA1 & 2)*
31058 - 204	7952 - E4	Level II BASIC and DOS Exits. *(Unused on standard VZ200/300)*

DOS Reserved Memory Area *(Top 310 Bytes)*

Offset		Description
Dec	Hex	
0 - 66	00 - 39	Vectors *(See Page3)*
67 - 76	43 - 4C	Sector Header *(GAP2)*
77 - 204	4D - CC	Sector Data Buffer
205 - 206	CD - CE	Sector Checksum Storage
207 - 230	CF - E6	Unused (?)
231 - 310	E7 - 136	Track Map Buffer

- 2 -

DOS Vector Description *(pointed to by IY Regs)*

Offset		Description
Dec	Hex	
0	0	File Control Block N° *(0 = FCB1, 1 = FCB2)*
1 - 8	1	Filename
9	9	Required File Type/Found File Type
11	0B	Selected Drive Pattern *(00H = Drive1, 80H = Drive2)*
12	0C	**Open** Requested Mode *(0 = Read, 1 = Write)*
13	0D	Source Drive for **Dcopy**
14 - 15	0E - 0F	User Buffer Address
16	10	Destination Drive for **Dcopy**
17	11	User Specified Sector Number
18	12	User Specified Track Number
19	13	Retry Count
20	14	Current Track Number
21	15	Next Sector Number
22	16	Next Track Number
23 - 35	17 - 23	File Control Block 1 *(FCB1)*
36 - 48	24 - 30	File Control Block 2 *(FCB2)*
49 - 50	31 - 32	Pointer to Data Buffer
51	33	Copy of I/O Latch
52 - 53	34 - 35	Pointer to Track/Sector Map
54	36	Track Count for **Dcopy**
55	37	Track Pointer for **Dcopy**
56	38	Stepper Phase
57 - 66	39 - 42	Reserved for Future Expansion

File Control Block Description

Offset		Description
Dec	Hex	
0	00	In Use Flag *(0 = Not in Use, 1 = In Use)*
1	01	**Open** Status *(0 = Read, 1 = Write)*
2 - 10	02 - 0A	Filename
11	0B	Track Number
12	0C	Sector Number
13	0D	Entry in Sector

Common File Types

T	Basic Editor File	
B	Binary File	
D	Sequential Access Program Data File	
F	Quickwrite Document	
A	Russell Harrison's Edit Ass. File	
S	Dave Mitchell/Mark Hardwood Edit Ass.	Start Addr A280H

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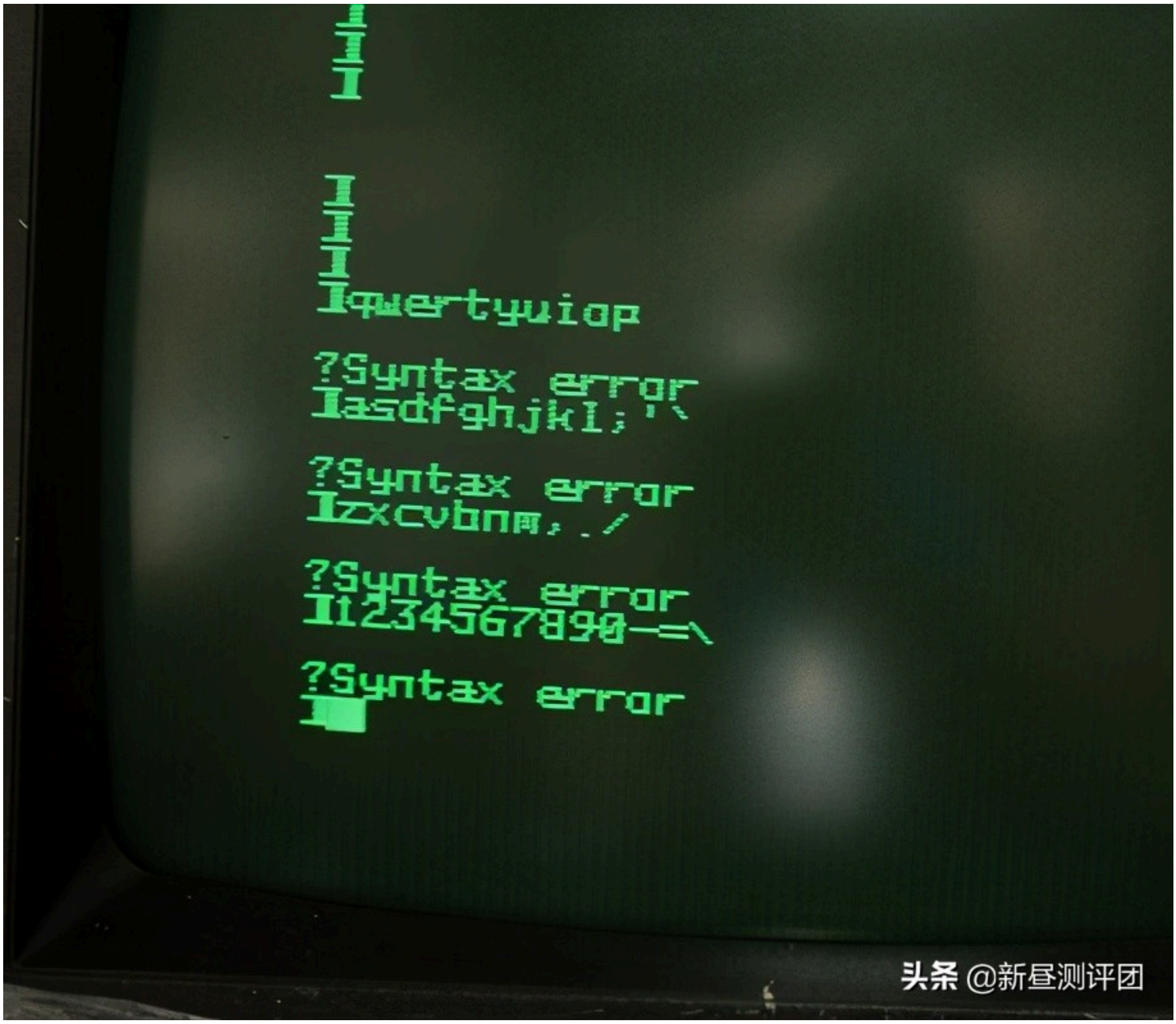
C64 doesn't have a manual, and it doesn't even know how to enter the drawing mode. It doesn't even provide drawing statements. From the current point of view, it is really impossible to play. It is too expensive to learn the poke instructions again. When I was on a business trip in the United States, I carried a C64 back, hahaha.

Laser 310, the Chinese learning machine, the basic sentence is very complete, suitable for learning, so the education department will promote it. I have used other machines in the same period, these two are indeed the best, and other strange and strange problems. Very unfriendly.



I also played a pinball game on LASER 310 back then, which is very easy to write. Or call bricks

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Interview postscript

Bai Guang's knowledge is very wide, and the chat is very enjoyable. As a player with a long and rich experience, he has unique insights into the past and current products. After the topic of Laser310, we talked a lot about Nissan PCs, IBM notebooks, trackballs, black apples, etc., and also talked about storage technologies such as magneto-optical disks and compressed floppy disks.

Desperately playing Saburo accurately described the scenes and pictures that the deputy used to study with this kind of computer earlier, from which I can feel the status and use environment of Laser310 at that meeting, and it also extends to the more common models in Taiwan, Europe and the United States, but rare in Asia — —Commodore 64.

"Laser 310, Apple II is still relatively good, the basic BASIC sentence is still enough. The most amazing is Commodore 64, a computer with such a large sales volume, but the BASIC sentence is not complete, many rely on POKE's quirky skills. Including changing the background color All things are realized by POKE, because the system itself does not provide the corresponding BASIC statement."

Very pleasant exchange, especially thanks to them for sharing.

4. Some materials and tutorials

There is not much information about Laser310 on the Internet, but because it was originally a Hong Kong-made version of two models such as VZ200 and VZ300, the information on VZ300 can also be used for Laser310.

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全部检索字段 包含检索词的结果 排序: 相关性 1/7 下一页

找到相关结果约 68 个，当前显示: 1-10

1. IBM-PC/LASER310图形集
文献类型: 专著
著者: 庄志荣
出版年份: 1990 出版社 科学普及出版社
来源数据库: 馆藏中文资源
摘要 目次 馆藏信息

2. LASER310微机在水泥制品养护中的...
文献类型: 期刊论文
著者: 葛衍民
出版年份: 1989
来源: 微型机与应用, Microcomputer & Its Applications,198...
来源数据库: 维普中文科技期刊数据库 / 知网-中国学术期刊全文数据库
摘要 目次 馆藏信息 在线阅读

3. 内存当磁盘——LASER310上实现程...
文献类型: 期刊论文
著者: 李华祥
出版年份: 1989
来源: 湛江水产学院学报,1989,Z1
来源数据库: 知网-中国学术期刊全文数据库
摘要 目次 馆藏信息 在线阅读

头条 @新豆测评团

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Although some have digital editions, they have limitations in the library and cannot be viewed on the Internet. I personally do not understand this very well.

But it is available under Baidu, which is very confusing. Of course, I still found many gameplays, which are very interesting. Maybe I can try them if I have time.

LASER—310机加接数字音响发生器

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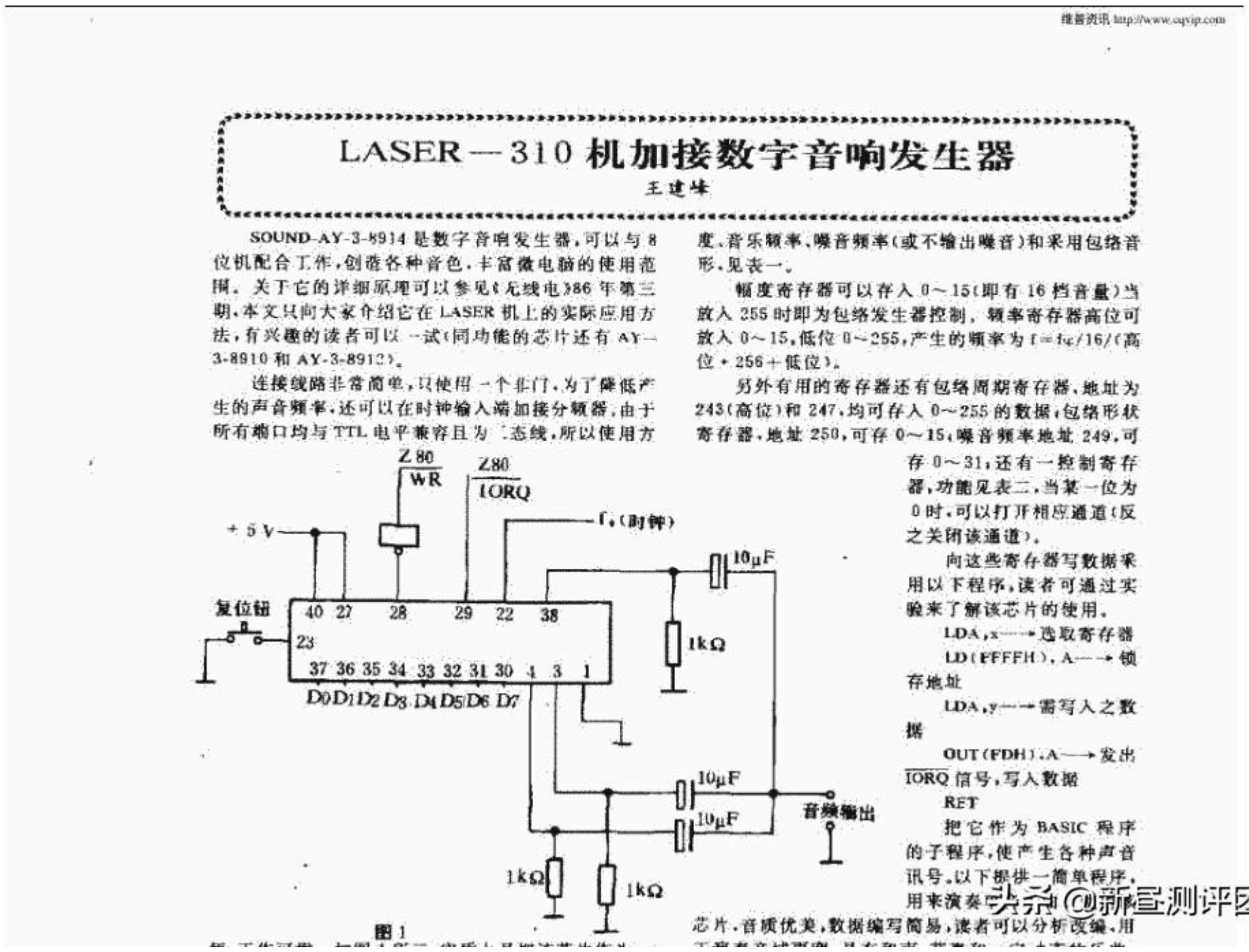

LASER—310 机加接数字音响发生器

王建峰

SOUND-AY-3-8914 是数字音响发生器，可以与 8 位机配合工作，创造各种音色，丰富微电脑的使用范围。关于它的详细原理可以参见《无线电》86 年第三期，本文只向大家介绍它在 LASER 机上的实际应用方法，有兴趣的读者可以一试（同功能的芯片还有 AY—3-8910 和 AY-3-8912）。

连接线路非常简单，只使用一个非门，为了降低产生的声音频率，还可以在时钟输入端加接分频器，由于所有端口均与 TTL 电平兼容且为三态线，所以使用方度、音乐频率、噪音频率（或不输出噪音）和采用包络音形，见表一。

幅度寄存器可以存入 0～15（即有 16 档音量）当放入 255 时即为包络发生器控制，频率寄存器高位可放入 0～15，低位 0～255，产生的频率为 f=fc/16/（高位×256＋低位）。

另外有用的寄存器还有包络周期寄存器，地址为 243（高位）和 247，均可存入 0～255 的数据；包络形状寄存器，地址 250，可存 0～15；噪音频率地址 249，可存 0～31；还有一控制寄存器，功能见表二，当某一位为 0 时，可以打开相应通道（反之关闭该通道）。

向这些寄存器写数据采用以下程序，读者可通过实验来了解该芯片的使用。

LDA，x——→选取寄存器

LD（FFFFH），A——→锁存地址

LDA，y——→需写入之数据

OUT（FDH），A——→发出 IORQ 信号，写入数据

RET

把它作为 BASIC 程序的子程序，使产生各种声音讯号。以下提供一简单程序，用来演奏

芯片，音质优美，数据编写简易，读者可以分析改编，用

图 1

头条 @新宝测评团

Along the way, I found a programming magazine that was about 80 years old. The name of this magazine is LEVZ, which is aimed at the Australian version of the VZ200 and VZ300 models.

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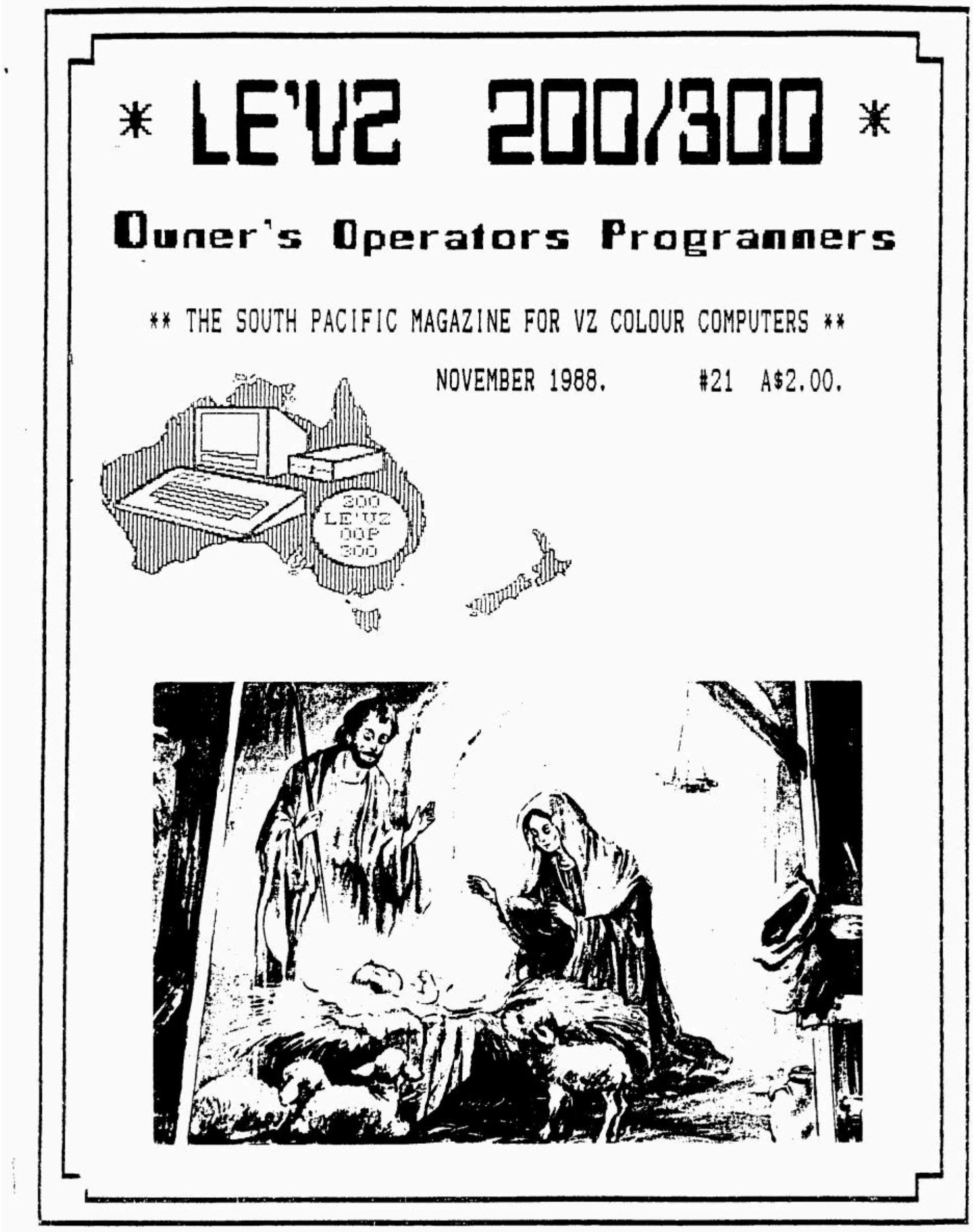

* LE'V2 200/300 *

Owner's Operators Programmers

** THE SOUTH PACIFIC MAGAZINE FOR VZ COLOUR COMPUTERS **

NOVEMBER 1988. #21 A$2.00.

头条 @新量测评团

It can be seen that it is still not easy to draw pictures on a computer like Laser310 that enter this bunch of codes one by one.

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When inquiring about information, I also found a price list from around 1990, which shows the prices of home computers published in two stores in Beijing, mainly Chinese learning machines.

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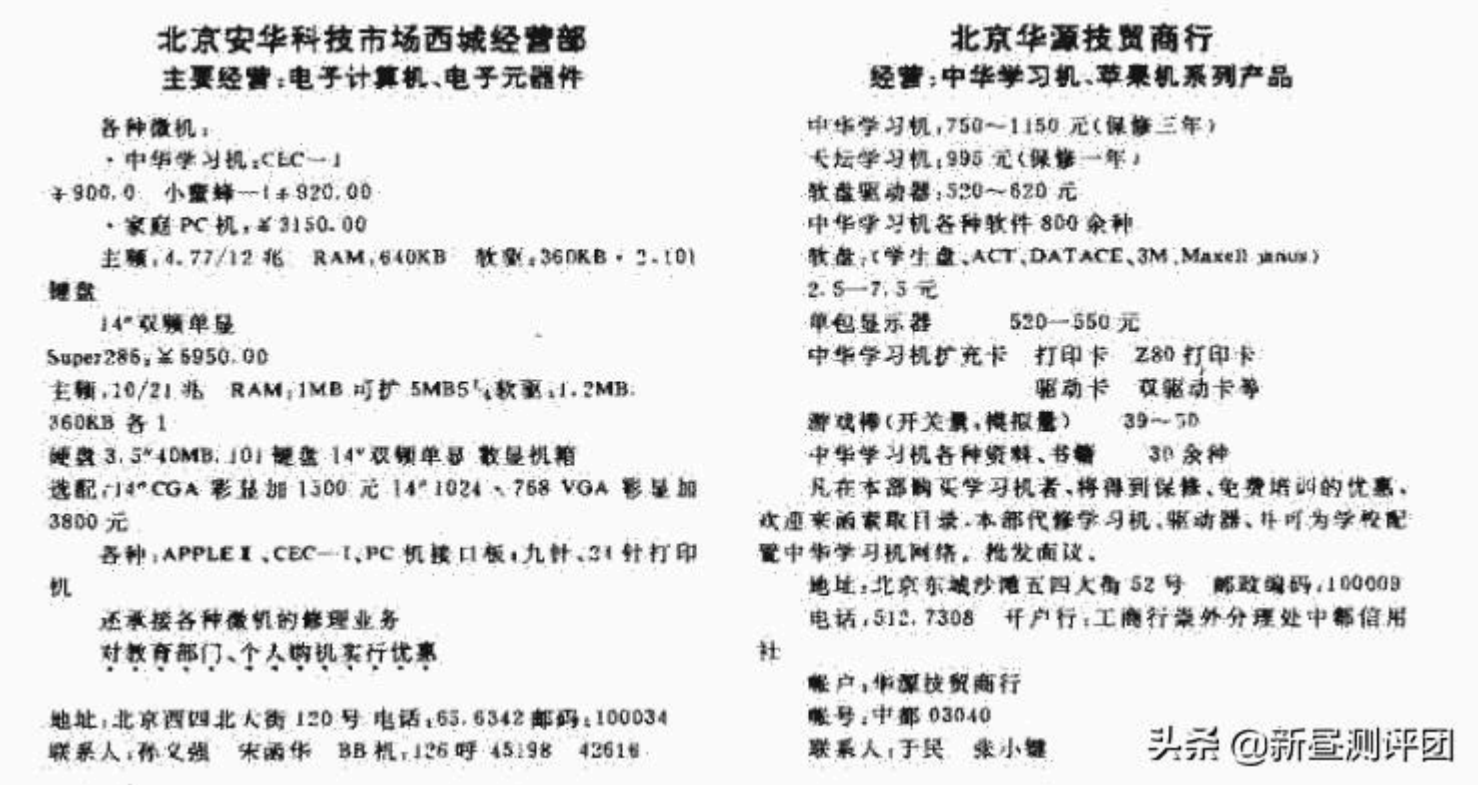

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头条 @新豆测评团

Memory expansion card

In addition, I also found the information about the memory expansion card. This article explains several available expansion memory solutions for Laser310, with concise circuit schematics and usage methods.

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全屏幕彩色绘图程序

本程序可在中华学习机上实现用键盘绘制彩色图形，并可随时删改，使绘图方便灵活。

程序运行后进入高分辨绘图状态，屏幕中心有一光点。按 I、M、J、K 键，光点分别向上、下、左、右移动并留下轨迹。按 T、G、Y、H 键，光点分别向左上、左下、右上、右下移动。按 O 键，再按上述 8 个键就可删除图形，按 L 键则又可绘图。按 R 键，再按颜色代号（见下表）就可达到改变颜色的目的。结束绘图按 E 键。程序清单见后。

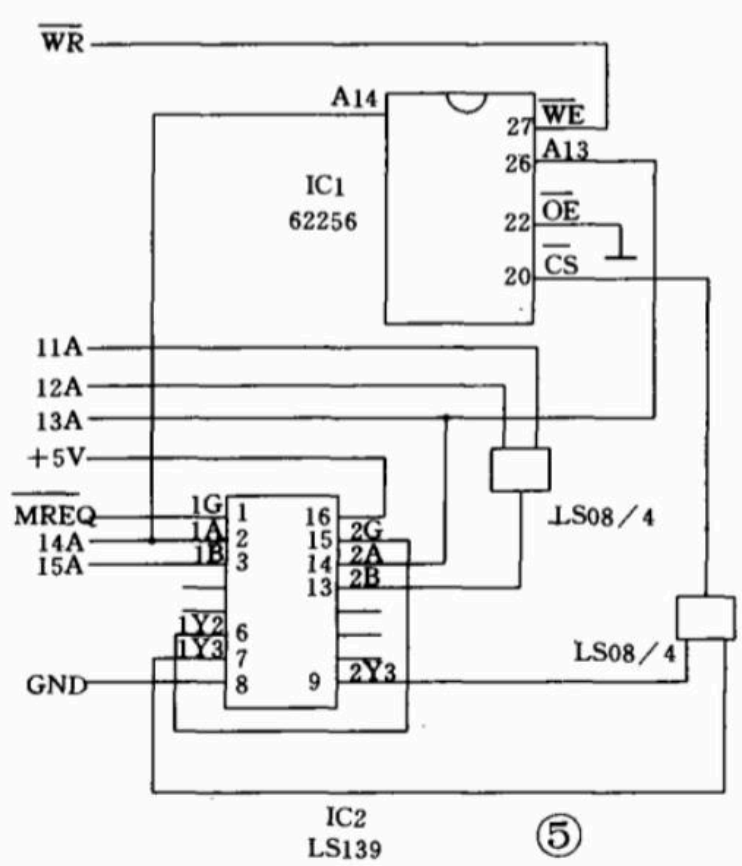
由于中华学习机高分辨率状态的彩色光点与 X 轴坐标的奇、偶数有关，绘图过程中若光点消失，按一下 J 或 K 键光点又会出现。在程序中加入相应语句就可实现对已绘图形存盘、打印等功能，有兴趣的读者可自行编制。

1	2	3	4	5	6
绿	紫	白	黑	橙	蓝

全屏幕彩色绘图程序清单

```
10   HGR2:N=3:HCOLOR=N
20   X=140:Y=95:B$="L"
30   HPLOT 0,0 TO 279,0 TO 279,191 TO
     0,191 TO 0,0
40   Z=PEEK(-16384):IF I>127 THEN
     A$=CHR$(Z-128):POKE-16368,0:
     GOTO 80
50   HPLOT X,Y:HCOLOR=0:HPLOY X,Y:
     HCOLOR=N
60   IF B$="L" THEN HPLOT X,Y
70   GOTO 40
80   IF A$="R"THEN GET N$:N=VAL
     (N$)
90   IF A$="T"THEN  X=X-1:Y=Y-1:
     GOTO 40
100  IF A$="G" THEN X=X-1:Y=
     Y+1:GOTO 40
110  IF A$="H" THEN X=X+1:Y=Y+1:
     GOTO 40
120  IF A$="Y" THEN X=X+1:Y=Y+1:
     GOTO 40
130  IF A$="I" THEN Y=Y-1:GOTO 40
140  IF A$="J" THEN X=X-1 GOTO 40
150  IF A$="K" THEN X=X+1:GOTO 40
160  IF A$="M" THEN Y=Y+1:GOTO 40
170  IF A$="L" OR A$="O" THEN B$=
     A$:GOTO 40
180  IF A$="E" THEN TEXT:END
190  CALL-198:GOTO 40
```

董 化



⑤

BFFFH 的 2k 地址，另一段从 E000H 至 F7FFFH 共 6k。图 3 总扩展地址是 B800H 到 F7FFH 合计 16k RAM。

图 5 是用一片 62256 为 310 机扩展 18k RAM 的电路，扩展部分使用的地址是从 B800H 至 FFFFH。图 5 所用元器件的数量少于图 4，而扩展容量反而大。另请注意：62256 是 32k 片子，而图中只使用了 18k，尚余 14k 没有使用。这是因为 Z80 CPU 的寻址能力为 64k，主机内已占用到 B7FFH，这样留给扩展 RAM 的可用逻辑地址只剩 B800H 到 FFFFH 这 18k，图 5 中占用的正是这一空间。另一方面采用所谓“虚拟”空间技术也完全可以根据需要扩充更大容量的存储体，如 LASER 原配 64k 卡和更大容量（128k 以上）的 QZL 多用途卡。大容量卡除硬件扩展外还必须由必要的软件支持管理其分配使用，如 QZL 卡在软件支持下可以作“电子磁盘机”使用，还可将 LASER 与任天堂类游戏机结合起来，即通过 LASER 把大型游戏节目调入 QZL 卡，再拿到游戏机上运行。支持软件一般是由专业人员编制的复杂系统，本文就不详述了。

头条 @新豆测评团

According to the data, these expanded memory can expand up to 18K of RAM after being added. This is because the addressing of the Z80 is only 64K, so the original 48K address has been used.

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Because I was very interested, I tried to reproduce this design. Although the required components are very old, I still have the opportunity to purchase on Taobao:

l Several capacitors

l 44Pin 2.54mm golden finger connector

l HM62256 RAM chip

l 74LS08P

l 74HC139N

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I also bought a UV erasable memory, EPROM.

Redrawing of Laser310 schematic

I have shown the circuit diagram of this station before, and I also found it on the domestic website. Thanks to the free electronicization and the predecessors who shared it.

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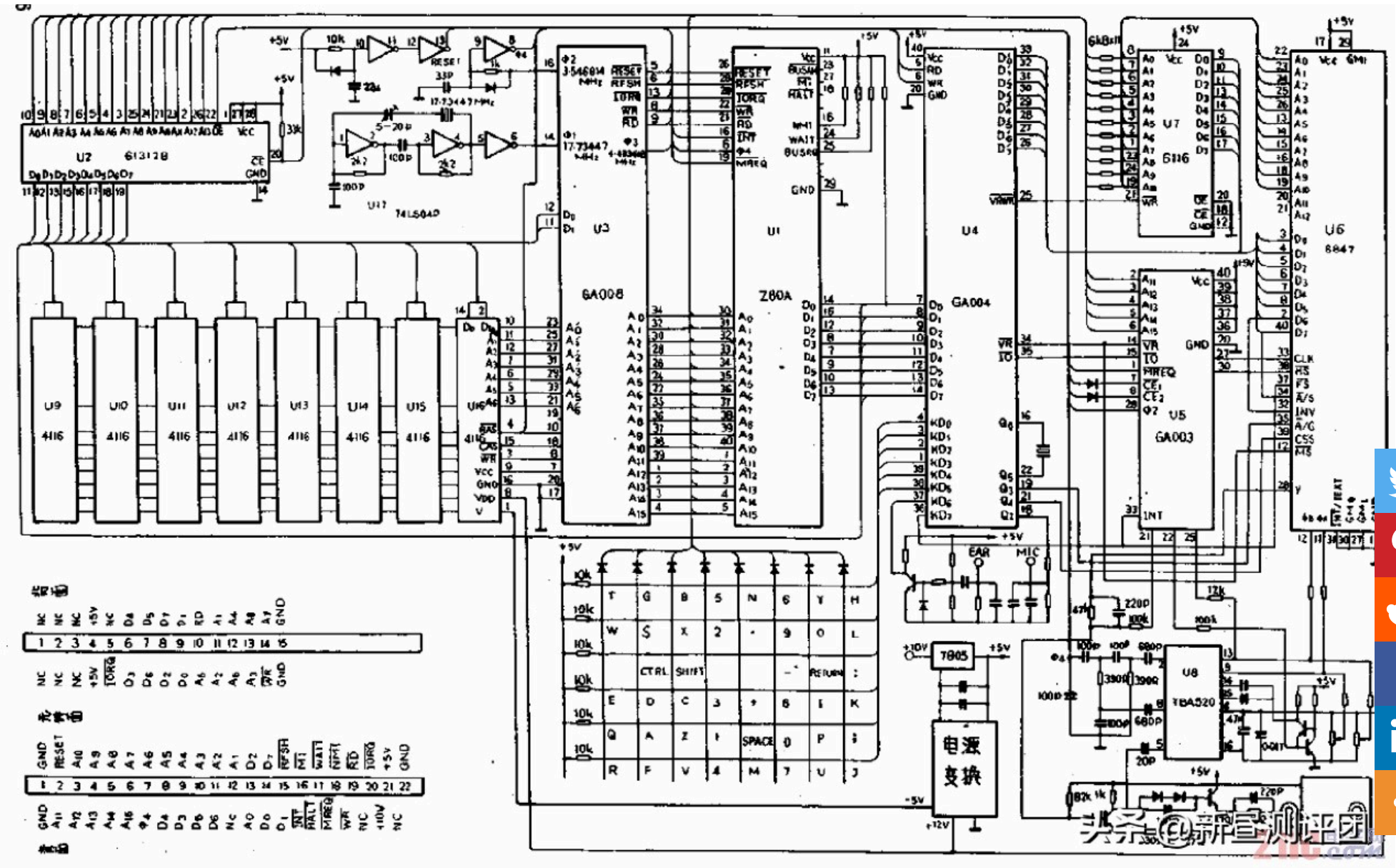
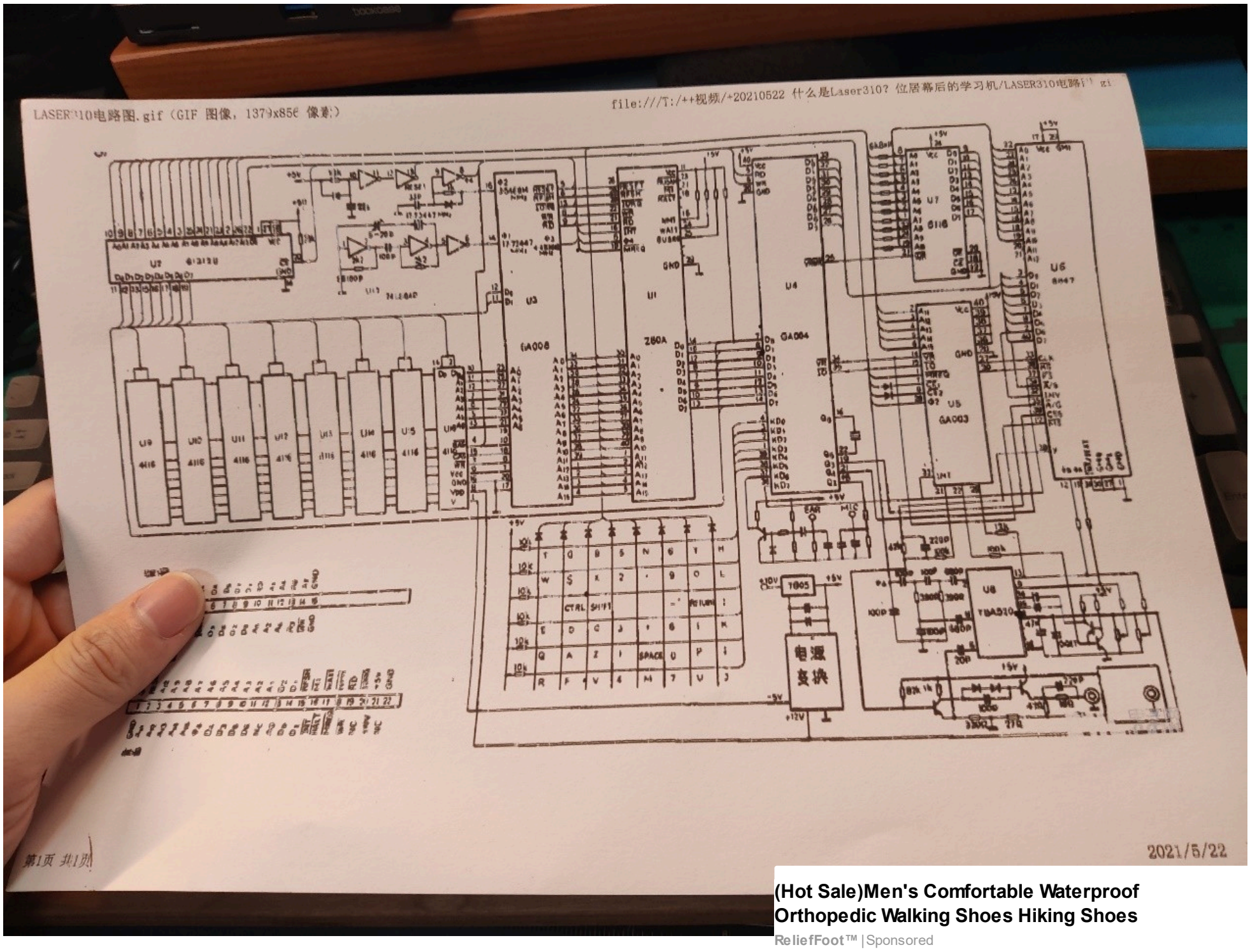


Although it was recognizable on the screen, when I tried to print it out, I found that it was really unclear, and the fonts were blurred and it was very hard to see.



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In this case, you need a clear picture. Is there any simple PS method? After thinking about it, I didn't expect to copy the pen again.

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